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PART IV.

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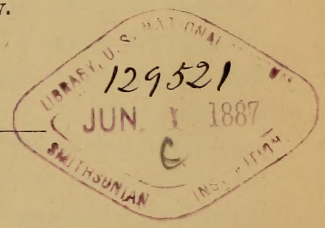

PART IV.

CONTAINING

THE ORDER UNGULATA, SUBORDER PROBOSCIDEA.

BY

RICHARD LYDEKKER, B.A., F.G.S., ETC.

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PREFACE.

It is gratifying to record the completion of Part IV. of this Catalogue; for although it embraces only a single Suborder of the Ungulata—the Proboscidea—yet the remains of this group (which holds so distinct a position amongst the "hoofed quadrupeds") are represented by so large and remarkable a collection of specimens as to be without a rival in any Museum.

This excellence is chiefly due to the grand collections from the Siwaliks of India, presented by Sir Proby T. Cautley (described by Dr. Hugh Falconer); the series of remains of *Dinotherium* and *Mastodon*, from Eppelsheim, &c. (described by Dr. Kaup); the fine collection of American Mastodons from the United States and from South America; the unrivalled British series of Mammoth-remains from the Thames Valley Brick-earth, the Dogger-Bank, and numerous other localities (described by Dr. Leith-Adams); and the unique collection of Pygmy-Elephant remains from Malta (described by Mr. George Busk, F.R.S., and Dr. Leith-Adams).

Nor are the facts relative to the almost world-wide geographical distribution of the Proboscidea in past times devoid of interest for the Palæontologist, coupled as they are with a singular absence of those intermediate types which might suggest lines of connection with the less aberrant forms of Ungulata. The present volume seems therefore to form an important addition to our knowledge of this most interesting group, to which the special attention of Biologists may well be directed.

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British Museum
(Natural History),
Department of Geology,
November 10, 1899.

INTRODUCTION.

A. *The Proboscidea.*

Since the cheek-teeth of the *Dinotheriidæ* do not differ in their mode of succession from those of the Perissodactylate and Artiodactylate suborders of the Ungulata, there can be no hesitation in employing the same system of enumeration; and the two premolars are accordingly respectively termed pm. 3 and pm. 4, and the milk-teeth which they replace mm. 3 and mm. 4. This being so, it will be obvious that the corresponding teeth of the *Elephantidæ* must also be numbered in the same manner. The first cheek-tooth which normally occurs in the *Elephantidæ* appears to be serially homologous with the two following teeth, and is accordingly reckoned as a milk-molar (mm. 2), although there is apparently only one known instance of its replacement by a premolar[1]; and hence the similarly-placed tooth which occurs in the lower jaw of *Dinotherium*[2] is also classed with the milk-series. In the absence of any evidence to the contrary, the so-called preantepenultimate milk-molar, which it is believed is occasionally developed in the *Elephantidæ*, is referred to the milk-molar rather than to the premolar series[3]. In the *Dinotheriidæ*, where the whole of the permanent cheek-series of teeth is in use at the same time, and where no one tooth attains excessive development, the third and fourth premolars attain the same rela-

[1] *Infrà*, p. 13. [2] *Infrà*, p. 3.

[3] The author is inclined to believe that the first cheek-tooth in the Perissodactyla—which in *Tapirus* is always replaced by a vertical successor, in *Rhinoceros* is occasionally so replaced, but in *Equus* never has any successor, and is frequently absent—belongs to the milk-molar rather than to the premolar series.

tive size as in other Ungulates, and are of equal functional importance; but in the *Elephantidæ* the tendency to the gradual increase in relative size of the hinder cheek-teeth, and especially of the third true molar, makes it evident that in the more specialized forms the occurrence of successional cheek-teeth in the earlier part of the series would be merely an encumbrance, and we accordingly find such teeth totally absent. In some of the earlier Mastodons, however, the premolars were probably of some slight functional importance; but their relatively small dimensions indicates that immediately the elephantine type of dental succession had commenced these teeth were practically doomed to disappear; and it is interesting to observe that while they had totally disappeared in the simple-toothed *Mastodon americanus* of the Pleistocene, they still lingered on in some of the generalized true Elephants of the Pliocene (*Elephas clifti* and *E. planifrons*), and thus exemplify the well-known fact that a much longer period is frequently required to eradicate functionally useless parts of the organism than to develop other parts to a comparatively high degree of specialization. This complete disappearance of the whole of the premolar and the retention of the milk-molar dentition is a feature quite peculiar to the *Elephantidæ*, although, if the writer's interpretation be correct, a similar instance occurs in respect of the first cheek-tooth of the Perissodactyla.

The specialization of the cheek-teeth in the higher members of the Proboscidea has followed to a considerable extent a line analogous to that obtaining in the Perissodactyla and Artiodactyla, and shows itself in the increased height and complexity of the crowns of these teeth, and in the final attainment of a nearly horizontal and continuous plane of wear. From the structure of the cheek-teeth in the more generalized members of the suborder, it may be inferred that the action of the molars of one jaw upon those of the other must have been mainly a scissor-like or snapping one, while in the more specialized forms this action has been converted into a perfect grinding motion.

The collection of Proboscidean remains recorded in the following pages is probably by far the largest in the world, and since it contains specimens belonging to nearly all the more important species, it is admirably adapted to exhibit the almost complete transition in respect of the structure of the cheek-teeth, which can be traced from the most generalized to the most specialized member of the *Elephantidæ*. So complete indeed is this transition (as will be indicated in

the sequel), that not only is there no real line of demarcation between *Mastodon* and *Elephas*, but several of the species of the two genera seem to pass so imperceptibly into one another, that it is not unfrequently a matter of extreme difficulty (if, indeed, it be not an absolute impossibility) to determine to which species individual teeth really belong. This difficulty is considerably enhanced by the peculiar nature of the dental succession of the *Elephantidæ*, in which only a moiety of the dental series is ever seen in any one fossil individual; and we have accordingly to rely only on their general *facies* in referring individual teeth to their respective species. In cases, therefore, where two or more closely allied forms occur in the same formation, it will be obvious that such determinations must not unfrequently be more or less provisional and subject to future revision[1]. The Indian Mastodons present especial difficulty in this respect; and I have found it advisable, after much hesitation, to apply specific names to no less than three trilophodont and five tetralophodont forms, some of which have a very restricted distribution. In regard also to the serial position of individual teeth, there must likewise in many cases be a considerable element of doubt, more especially in those instances where a species is liable to great variation in point of size; thus it is often difficult to say whether a tooth is the last milk-molar of a large individual or the first true molar of a smaller one, or whether a larger tooth should be regarded as a first or a second true molar. In this respect therefore some of the following determinations must also be considered more or less provisional. These two points of uncertainty are, however, not of very great import, and do not in the least interfere with the symmetry of the series from the generalized to the specialized; and at the most they indicate either that an individual specimen should be referred one degree higher or lower either in the specific series or in the dental series of a particular species.

Although the object of the present Catalogue is only to record species represented in the Museum Collection, yet in this instance, where we have only to deal with a restricted group containing a comparatively small number of species, it has been thought advisable to give a list of all the described forms together with their distribution. The following list, which is exclusive of synonymy, comprises all the well-authenticated species of which the writer can find any record; those species of which he has seen no

[1] For the sake of brevity a provisional determination is only mentioned in the text in some of the most doubtful cases.

figures are marked by an asterisk; and in the case of fossil species which are not recorded in the text of this Catalogue a reference is given to the original place of publication of the name. Fuller descriptions and figures of some of the American forms are required before their right to specific distinction can be regarded as certain, or their proper position in the series as finally determined.

List of Species of Proboscidea.

Family Dinotheriidæ.

1. Dinotherium giganteum, Kaup (*ex* Cuv.).
   Europe. Mid. Miocene to Low. Pliocene.
2. Dinotherium indicum, Falconer.
   India. Pliocene (and ? Up. Miocene).
3. Dinotherium sindiense, Lydekker[1].
   Western India. Low. Pliocene, or Up. Miocene.

Family Elephantidæ.

4. Mastodon americanus (Cuv.).
   North America. Pleistocene.
*5. Mastodon proavus, Cope[2].
   North America. Pliocene (Ticholeptus beds).
6. Mastodon borsoni, Hays.
   Europe. Up. and Low. Pliocene.
7. Mastodon turicensis, Schinz.
   Europe. Mid. Miocene.
*8. Mastodon serridens, Cope[3].
   North America (Texas). Pliocene.
9. Mastodon angustidens, Cuv.
   Europe. Mid. Miocene (? N. America—Pliocene).
   Var. *palæindicus*, Lydekker.
   N.W. Frontier of India. Low. Pliocene, or Up. Miocene.
10. Mastodon obscurus, Leidy[4].
    North America. Pliocene (Loup Fork).
11. Mastodon productus, Cope[5].
    North America. Pliocene (Loup Fork).

Trilophodont group.

[1] Palæontologia Indica (Mem. Geol. Surv. Ind.), ser. 10, vol. i. p. 196 (1880). A very small species.

[2] Rep. U. S. Geol. Surv. Terr. for 1873, p. 531 (1874). A preliminary notice appeared in 1873. Of large size; regarded as allied to *M. borsoni* and as the ancestor of *M. americanus*.

[3] *Loc. cit.* Founded on a single tooth, which is said to resemble *M. turicensis* and also *M. shepardi*.

[4] Journ. Ac. Nat. Sci. Philad. ser. 2, vol. vii. p. 396 (1869). Closely allied to *M. angustidens*.

[5] Proc. Ac. Nat. Sci. Philad. 1874, p. 221. Allied to *M. angustidens*; three premolars are developed.

12. MASTODON PANDIONIS, Falconer.
Western India. Pliocene (and? Up. Miocene).
13. MASTODON PENTELICI, Gaudry and Lartet.
Europe (Greece and Hungary) and Persia. Low. Pliocene.
14. MASTODON FALCONERI, Lydekker.
Western India. Pliocene.
*15. MASTODON EUHYPODON, Cope [1].
North America (Kansas). Pliocene (Loup Fork).
16. MASTODON HUMBOLDTI, Cuvier.
South America. Pleistocene.
17. MASTODON TROPICUS (Cope [2]).
North America (Mexico). Pliocene (Loup Fork).
18. MASTODON SHEPARDI, Cope [3] (*ex* Leidy).
North America (California and Mexico). Pliocene (Loup Fork).
19. MASTODON CORDILLERUM, Cuvier.
South America. Pleistocene.
20. MASTODON SIVALENSIS, Cautley.
India. Pliocene.
21. MASTODON ARVERNENSIS, Croizet and Jobert.
Europe. Up. and Low. Pliocene.
22. MASTODON MIRIFICUS, Leidy [4].
North America. Pliocene (Loup Fork).
*23. MASTODON CAMPESTER (Cope [5]).
North America. Pliocene (Loup Fork).
24. MASTODON PERIMENSIS, Falconer and Cautley.
Western India. Pliocene.
25. MASTODON PUNJABIENSIS, Lydekker.
North-western India. Pliocene.
26. MASTODON LONGIROSTRIS, Kaup.
Europe. Low. Pliocene.
27. MASTODON ATTICUS, Wagner.
Greece. Low. Pliocene.
28. MASTODON CAUTLEYI, Lydekker.
Western India. Pliocene.
29. MASTODON LATIDENS, Clift.
India, Burma, and Borneo. Pliocene.

Trilophodont group.

Tetralophodont group.

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[1] Amer. Nat. vol. xviii. p. 525 (1884). A small species, with molars like those of *M. angustidens*, but with a short mandibular symphysis.

[2] Proc. Amer. Phil. Soc. vol. xxii. p. 7 (1885; read 1884)—*Dibelodon*. Of large size, with a short, edentulous mandibular symphysis; the molars resemble those of *M. cordillerum*.

[3] *Loc. cit.* Closely allied to the preceding, but of smaller size.

[4] Proc. Ac. Nat. Sci. Philad. for 1858, p. 10 (1859).

[5] Proc. Amer. Phil. Soc. vol. xvii. p. 225 (1878; read 1877)—*Tetralophodon*. The mandibular symphysis is elongated, and furnished with incisors; the columns of the ridges of the molars are arranged somewhat alternately, and there are no accessory tubercles in the valleys.

30. Elephas clifti, Falconer and Cautley.
India, Burma, China, and Japan.
31. Elephas bombifrons, Falconer and Cautley.
India, and (?) China. Pliocene.
32. Elephas ganesa, Falconer and Cautley.
India. Pleistocene and Pliocene.
33. Elephas insignis, Falconer and Cautley.
India, Burma, China, (?) Java, and Japan. Pliocene, and ? Pleistocene.

Stegodont group.

34. Elephas planifrons, Falconer and Cautley.
India. Pliocene.
35. Elephas meridionalis, Nesti.
Middle and South Europe, and (probably) North Africa. Up. and Low. Pliocene.
36. Elephas hysudricus, Falconer and Cautley.
India. Pliocene, and (?) Pleistocene.
37. Elephas antiquus, Falconer.
Europe. Pleistocene, and (?) Upper Pliocene.
*38. Elephas atlanticus, Pomel [1].
North Africa. Pleistocene.
39. Elephas mnaidriensis, Leith-Adams.
Malta. Pleistocene.
40. Elephas melitensis, Falconer.
Malta, and (?) North Africa. Pleistocene.
41. Elephas africanus, Blumenbach.
Africa. Recent.
42. Elephas namadicus, Falconer and Cautley.
India, Burma, China, and Japan. Pleistocene.
43. Elephas columbi, Falconer.
Central and North America.
44. Elephas armeniacus, Falconer.
Armenia. (?) Pliocene.
45. Elephas indicus, Linn.
Southern Asia. Recent.
46. Elephas primigenius, Blumenbach.
Northern Europe, Asia, and America. Pleistocene.

Elephantine group.

47. Notelephas australis, Owen [2].
Australia. Pleistocene.

The most remarkable point in regard to the vertical distribution of the Proboscidea is their apparently sudden appearance in the Middle Miocene of Europe, where they are represented by *Dinotherium giganteum* and *Mastodon angustidens*. Although the former is evidently a generalized form connecting the *Elephantidæ* with

[1] Bull. Soc. Géol. France, sér. 3, vol. vii. p. 51 (1879). Said to be intermediate between *E. antiquus* and *E. africanus*.

[2] Phil. Trans. 1882, p. 777. Founded upon a fragment of an incisor, which apparently presents no characters by which it can be generically distinguished from a tusk of *Elephas* or *Mastodon*.

the less aberrant Ungulates, yet it cannot be regarded as the direct ancestor of any known member of that family; and the latter is to all intents and purposes a perfect Elephant, in the widest sense of that term. Our comparatively full knowledge of the Lower-Miocene and Upper-Eocene Mammalian faunas of the greater part of Europe and North America (where the Proboscidea are unknown till the Pliocene) renders it almost certain that neither of those regions was the home of the direct ancestors of the *Elephantidæ*; and we must therefore look forward to the discovery of mammaliferous Lower-Miocene or Upper-Eocene strata in some other region of the (probably Old) World, which may yield these missing forms. There is, however, but little chance of the occurrence of such beds in India, and our main hope must therefore be directed to other parts of Asia, or Africa, if indeed these regions were ever populated in early Tertiary times by the larger Mammalia.

In regard to geographical distribution there appears to be considerable evidence in favour of an easterly migration of the Mastodons having taken place from Europe to India [1]; while the restriction of the stegodont group of Elephants to the latter country and the regions to the eastward, points to the conclusion that the transition from the Mastodons to the higher Elephants took place in those regions; from which we may also infer that there subsequently ensued a westerly migration of these higher forms to Europe, and finally on to North America, where the true Elephants did not make their appearance till the Pleistocene, and then appear to have been represented only by two species, one of which ranged over the greater part of the higher latitudes of the northern hemisphere.

B. *Geological Horizons.*

The quotation in the present and the two previous Parts of many mammaliferous localities not mentioned in the table of strata given on pp. x, xi of the first Part, renders it advisable to give a fuller list of European Tertiary horizons. The following table differs from the one above referred to by the inclusion of the Eppelsheim beds in the Lower Pliocene instead of in the Upper Miocene, the writer being now convinced that this view, which is adopted by nearly all English and German palæontologists, is the correct one[2].

[1] See 'Palæontologia Indica' (Mem. Geol. Surv. India), ser. 10, vol. iii. pp. 17, 18.

[2] The beds of Mont Léberon and Cucuron in Vaucluse are included in the Lower Pliocene, both on account of the similarity of their fauna to that of the Pikermi beds, and also because they overlie marine beds correlated with the

As a compromise, which has the convenience of avoiding the necessity of abolishing the term Middle Miocene[1], which has become almost a classic one through the labours of the French palæontologists, the term Upper Miocene may be retained for the Œningen or higher beds of the Upper Swiss freshwater molasse[2], which connect the Eppelsheim beds with the typical Middle Miocene of France, and are placed by some geologists in the Miocene[3], and by others[4] at the base of the Pliocene with the Eppelsheim beds. The lower beds of the upper Swiss molasse (Käpfnach, Elgg, &c.), which were included by Heer in his Œningen stage, appear to correspond to the French Middle Miocene. The Congerian stage of the Vienna Basin is included in the Lower Pliocene, while the Sarmatian and Mediterranean (Leithakalk) stages of the same region are mainly classed with the upper part of the Middle Miocene; the Upper Sarmatian stage probably, however, corresponds in part with the Œningen beds, while the Mediterranean stage probably contains representatives of group B. It is, however, necessary to mention that the classification adopted is to a considerable extent a faunal one, and that, owing to regional distribution, the fauna of one group may in some instances be contemporaneous with that of another group. This appears to be the case with the mammals of Pikermi, which have been shown by Fuchs[5] to occur in a comparatively high Pliocene horizon, and in reality, therefore, were probably contemporaries of the more advanced fauna of other parts of Europe, but our knowledge is at present insufficient to indicate the relations of the fauna of some of the other deposits placed in the same group. A well-known

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Tortonian stage (Gaudry, 'Animaux Fossiles et Géologie du Mont Léberon,' p. 106), which is the equivalent of the Pliocene Congerian (Inzersdorf and Belvedere) stage of the Vienna Basin (see Credner, 'Elemente der Geologie,' 5th ed. p. 707). Some English geologists (Geikie and Duncan) retain, however, the Vaucluse beds in the Upper Miocene. The Concud beds of Spain, and those of Baltavár in Hungary, as well as those of Maragha in Persia, are placed in the same group with the Pikermi beds solely on account of the similarity of their Mammalian fauna.

[1] If the term Upper Miocene were adopted for these beds, it would probably lead to confusion, as it would not correspond with the Upper Miocene of the French geologists.

[2] The beds at Cerdagne (Pyrénées-Orientales) are probably approximately equivalent.

[3] Duncan, 'Lyell's Elements of Geology,' 4th ed. p. 184 (1885), and Geikie, 'Text-book of Geology,' 1st ed. pp. 867–8 (1882).

[4] Credner, 'Elemente der Geologie,' 5th ed. p. 696 (1883).

[5] See Blanford, Presidential Address to Geol. Sect. British Association, 1884.

instance of such regional distribution occurs in the mammalian faunas of Pleistocene Europe and modern Africa, both of which, if found in a fossil condition, would almost certainly be placed on the same geological horizon[1], and it is pretty certain that there must be many analogous examples lower down in the geological scale.

In the third column of the new table the divisions of the Oligocene are given as now generally accepted by English writers. The reasons why these divisions are not adopted in the present work are, first, that it is at present almost impossible to classify the American Tertiaries so as to make them harmonize with this triple division; secondly, that geologists are not all agreed as to the limits of the term Oligocene[2]; and, thirdly, that the writer has desired, as far as possible, to make the geological classification employed in this work agree with that adopted by Professor Flower in the 'Catalogue of the Vertebrata in the Museum of the Royal College of Surgeons,' part ii. Mammalia (1884).

TABLE OF EUROPEAN MAMMALIFEROUS STRATA.

Without Oligocene.		*With Oligocene.*
PLEISTOCENE.	Tour-de-Boulade and Neschers[3] (Puy-de-Dôme), and all beds above the St. Prest and Forest-bed groups.	PLEISTOCENE.
LOWEST PLEISTOCENE or TOPMOST PLIOCENE.	St. Prest (Eure-et-Loire). Malbattu (Haute-Loire). Norfolk Forest-bed.	LOWEST PLEISTOCENE or TOPMOST PLIOCENE.
UPPER PLIOCENE.	Val d'Arno (Tuscany). Perrier, Ardé, Peyrolles, &c. (Puy-de-Dôme). Coupet and Vialette (Haute-Loire). Norwich Crag.	UPPER PLIOCENE.

[1] The most noticeable common forms are *Hyæna crocuta*, *H. striata*, *Felis leo*, *F. pardus*, *F. pardina*, and *Hippopotamus amphibius*.

[2] Thus Max Schlosser ('Palæontographica,' vol. xxxi. p. 96) retains group A of the following table in the Lower Miocene, and commences the Upper Eocene with the Montmartre gypsum, the upward restriction of the Oligocene being followed in the table given in Part I. of this Catalogue. Geikie again ('Text-book of Geology,' 1st ed. p. 856) includes both groups A and B of the Lower Miocene in the Upper Oligocene, and restricts the Middle Oligocene to the Calcaire de Brie and its equivalents.

[3] See Depéret, 'Bull. Soc. Géol. France,' sér. 3, vol. xii. p. 283. The Neschers beds are quoted in Part I. p. 130 of this work as Pliocene.

Without Oligocene.				*With Oligocene.*
Lower Pliocene.	A. *a.*	Asti (Piedmont)[1].		Lower Pliocene.
		Perpignan (Pyrénées-Orientales).		
		Montpellier (Hérault).	*Astien*[2].	
		Astesan (Tuscany).		
		Red Crag.		
		Castell' Arquato (Plaisantin).	*Plaisancien*[3].	
		Felsino and Riosto (Bologna).		
	b.	Alcoy (Spain).		
		Casino (Tuscany).		
		Crimea and Roumania (?).	*Messinien.*	
		Coralline Crag.		
		Antwerp (Belgium).		
	B.	Pikermi (Attica).	*Upper Miocene of French geologists.*	
		Mont Léberon and Cucuron (Vaucluse).		
		Concud (Spain).		
		Baltavár (Hungary).		
		Congerian of Vienna basin.		
		Eppelsheim (Hessen-Darmstadt).		
		? Podolia (S.W. Russia).		
Upper Miocene.		Œningen (Switzerland).		Upper Miocene.
		Cerdagne (Pyrénées-Orientales).		
		? Upper Sarmatian.		
		? Upper Falunian.		
Middle Miocene.	A.	Sansan, Villefranche d'Astarac, and Simorre (Gers).		Miocene.
		Falunian of Touraine.		
		Léognan and Romans (Gironde).		
		Barie (Drôme).		
		Grive-St.-Alban (Isère).		
		St. Gaudens (Haute-Garonne).		
		Montpellier (Hérault).		
		Chazé-Henri and Doué (Maine-et-Loire).		
		Gaudino (Lombardy).		
		Käpfnach, Chaux-des-Fonds, and Elgg (Switzerland).		
		Georgensgmünd (Würtemberg).		
		Steinheim and Bleichenbach (Bavaria).		
		Low. Sarmatian and Mediterranean of Vienna basin.		
		Eibiswald (Styria).		
	B.	Montabuzard (Loiret).		
		Chevilly and Neuville, near Orléans (Loiret).		
		Avaray (Loir-et-Cher).		
		Monte Bamboli (Tuscany).		
		(?) Baltringen (Würtemberg)[4].		
		(?) Belluno (Italy)[5].		

[1] Apparently transitional between the Perpignan and the Val d'Arno horizons; see Depéret, 'Thèses Facult. Sci. Paris,' sér. A, no. 67—Bassin Tertiaire de Rousillon, p. 240 (1885).

[2] Depéret (*op. cit.* p. 232), who retains the Pikermi and allied groups in the Upper Miocene, proposes the term Middle Pliocene for the Astien stage.

[3] According to Depéret (*op. cit.* p. 243) the marine fauna of the Plaisancien must be grouped with the land Astien fauna.

[4] According to Vacek, Abh. k.-k. geol. Reich. vol. vii. pt. 4, p. 13 (1877), *Mastodon angustidens* occurs in the Baltringen beds.

[5] *Squalodon catulli* of these beds has been recorded from Baltringen.

Without Oligocene. *With Oligocene.*

Lower Miocene.	A.	Weissenau, near Mayence.	Upper Oligocene.
		Roth, near Bonn.	
		Haslach and Eggingen (Würtemberg).	
		Hochheim, near Wiesbaden.	
		St. Gérand-le-Puy, Randan, Gannat, Ratri, and Billy (Allier).	
		Issoire, Cournon, and Antoin (Puy-de-Dôme).	
		Alais (Gard).	
		Rochette, near Lausanne (Switzerland)[1].	
	B.	Fontainebleau (Seine-et-Marne).	Middle Oligocene.
		Ferté-Alais (Seine-et-Oise).	
		Villebramar (Lot-et-Garonne).	
		(?) Aarwangen (Switzerland).	
		Cadibona (Liguria).	
		Flonheim and Ufhofen (Hessen-Darmstadt).	
		Lobsann (Alsace).	
		Digoin (Saône-et-Loire)[2].	
		Ronzon, near Puy-en-Velay (Haute-Loire)[3].	
		Hempstead (Isle of Wight)[3].	
Upper Eocene.	A.	Brie (Charente).	
		Caylux, Mouillac, &c. (Central France)[4].	
		(?) Œrlinger-Thal, Pappenheim, Egerkingen, and Mauremont (Switzerland), *in part.*	
	B. *a.*	Bembridge (Isle of Wight).	Lower Oligocene.
		Montmartre, near Paris.	
		Débruge (Vaucluse).	
		Souvignargues and St. Hippolyte (Gard).	
		Frohnstetten (Würtemberg).	
	B. *b.*	Hordwell (Hants)[5].	
		(?) Mauremont, &c. (Switzerland), *in part.*	
	C.	Beauchamp, near Paris.	Upper Eocene.
		Barton (Hants)[6].	
		(?) Promina (Dalmatia).	

[1] Placed in the table in Part I. in group B, but quoted by Teller, Beitr. Pal. Ost-Ung. vol. iv. pt. i. p. 60, as belonging to the Upper Oligocene.

[2] *Hyopotamus porcinus* is common to these and the Hempstead beds.

[3] Gaudry and Filhol affiliate these beds with the Miocene rather than with the Eocene; and the Lobsann beds, with which they are usually correlated (see Teller, *op. cit.* p. 57), seem to connect them inseparably with the Cadibona beds.

[4] The fauna of these beds is transitional between that of the Montmartre gypsum and the typical Lower Miocene.

[5] In the table in Part I. these beds were placed (after Gaudry) with the Beauchamp group, but English geologists associate the latter with the Barton beds.

[6] *Zeuglodon* occurs in these beds.

Without Oligocene.			*With Oligocene.*
Middle Eocene.		Nanterre, Gentilly, and Batignolles, near Paris. Argenton (Indre). Issel (Aude). Bucshweiler (Alsace). Bracklesham (Sussex). ? Ober-Gosken, Egerkingen, &c. (Switzerland), *in part*.	Middle Eocene.
Lower Eocene.	A.	London Clay. Cuyse-la-Motte (Marne).	Lower Eocene.
	B.	Meudon, near Paris. Soissons (Aisne). Woolwich and Reading.	
	C.	La Fère (Aisne). Reims[1] (Marne).	

The Maragha beds of North-west Persia may be placed in the same group as the Pikermi beds. The Maltese beds are probably in part Middle, and in part Lower Miocene (Oligocene). The Bridger group of North America appears to be Middle, and the Wasatch Lower Eocene. The Lower Siwaliks of Sind may be Upper Miocene.

In conclusion, I have again to express my obligation to those gentlemen who have kindly favoured me with the loan of woodblocks, and to add to the list mentioned in the preceding Parts the name of Dr. J. E. Taylor, of the Ipswich Museum. I have also to offer my thanks to Mr. H. B. Medlicott, Director of the Geological Survey of India, for sending home several specimens of Indian *Mastodon*-teeth from the Calcutta Museum, which have enabled me to amend some of my previous identifications. Plaster models of these important specimens have been made by the Museum Formatore and added to the Collection. Mr. W. Davies has again been good enough to verify the description and number of each specimen; and it is in many instances solely due to his intimate acquaintance with individual specimens that it has been possible to record the history of their acquisition.

The *Dixon Collection*, which is mentioned for the first time in this Part, was purchased in 1853 from Mr. F. Dixon, of Worthing, and mainly comprises specimens from the south of England.

RICHARD LYDEKKER.

The Lodge, Harpenden,
Hertfordshire.
October 1, 1886.

[1] Cernayisien stage.

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ABBREVIATIONS OF SERIALS QUOTED IN PART IV.,

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[Where not otherwise stated, the works are in 8vo.]

Abh. k.-k. geol. Reichs.—Abhandlungen der kaiserlich-königlichen geologischen Reichsanstalt. 4to. *Vienna.*

Ann. Soc. Agric. Lyon.—Annales des Sciences . . . publiées par la Société d'Agriculture, etc., de Lyon. 4to. *Lyons.*

Beitr. Geol. Ost-Asiens u. Austral.—Beiträge zur Geologie Ost-Asiens und Australiens; in Sammlungen des Geologischen Reichs-Museums in Leiden. *Leyden.*

Jahrb. k. preuss. geol. Land.—Jahrbuch der königlichen preussischen geologischen Landesanstalt. *Berlin.*

Jahresb. k. ung. geol. Anstalt.—Jahresberichte der königlichen ungarischen geologischen Anstalt. *Buda-Pesth.*

Journ. Derb. Arch. Soc.—Journal of the Derbyshire Archæological and Natural History Society. *Derby.*

Nuov. Giorn. Letter.—Nuovo Giornale de Letterati d'Italia. *Modena.*

Parthenon.—The Parthenon, a Weekly Journal of Literature, Science, and Art. 4to. *London*, 1862–3.

Sitz. niederrhein. Ges.—Sitzungsberichte der niederrheinischen Gesellschaft zu Bonn. *Bonn.*

Thèses Facult. Sci. Paris.—Thèses présentées à la Faculté des Sciences de Paris, etc., etc. *Paris.*

CORRIGENDA ET ADDENDA.

Part I., p. xi, line 18 from top, *for* New Forest *read* near Paris.
43, *for* 59674 *read* 49674, *and after* 49674 *add* a. 11929 is from the Val d'Arno (Neues Jahrb. 1859, p. 270).
,, line 12 from bottom, *for* $\overline{\text{m. 1}}$ *read* $\overline{\text{pm. 3}}$.
107, line 16 from bottom, *for* $\underline{\text{pm. 4}}$ *read* $\overline{\text{pm. 4}}$.
137, line 3 from top, *for* Lower *read* Middle.
231. *Arvicola ambiguus* is apparently identical with *Myodes torquatus* (Pall.). (Proc. Zool. Soc. 1874, p. 460.)

Part II., p. 113. *Cervus tetraceros.* The first publication is Mackie, 'Geologist,' vol. iv. p. 466 (1861).
117, line 18 from bottom, *for* xxxvi. *read* xxxiv.
148, first line, *for* $\frac{3}{3}$ *read* $\frac{4}{3}$.
257, line 24 from top, *for* maxilla *read* ramus of mandible.

Part III., p. 51. *Hipparion crassum*, Gerv., according to Depéret (Thèses Facult. Sci. Paris, sér. A, no. 67, p. 187 [1885]), is distinct from *H. gracile.*
66, line 13 from bottom, *for* true molars *read* cheek-teeth.
100. The Maragha *Rhinoceros* has been named *R. persicæ*, Pohlig (Quart. Journ. Geol. Soc. vol. xlii. p. 178 [1886]), and was furnished with lower canines.
183, line 11 from top, *for* right *read* left.

CATALOGUE

OF

FOSSIL MAMMALIA.

PART IV.

Order UNGULATA.

Suborder *PROBOSCIDEA.*

In the carpus the scaphoid is supported by the trapezoid, but not by the magnum, the latter supporting the lunar; while in the tarsus the cuboid articulates proximally with the distal face of the navicular, but not with the astragalus. In both the carpus and tarsus the component bones interlock but very slightly, the type of structure of the tarsus being one step in advance of that obtaining in the Condylarthra[1]. The feet are plantigrade; there are five digits to each foot; the astragalus is flat; the femur has no third trochanter; the fibula articulates with the calcaneum; and the jugal forms the middle of the zygomatic arch. The brain is of large size; canines appear to be always absent; while incisors are present either in the upper or lower jaws of the males of all the forms at present known[2]. The cheek-teeth[3] may attain extreme complexity; and the true molars always consist of transverse ridges, which may vary greatly in height, and may be either uninterrupted, or split up into inner and outer columns, which may have a more or less

[1] *Vide suprà*, Part III. p. 172.

[2] They are rudimentary in one race of *Elephas indicus*.

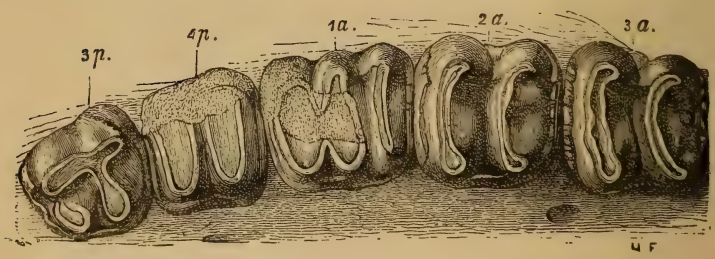
[3] In enumerating the premolars and milk-molars of the Proboscidea, the same system is adopted as in the preceding groups, the last tooth of the two series being respectively termed pm. 4 and mm. 4 (see Introduction).

alternate arrangement; there are never fewer than three such ridges in the last milk- and the first true molars; and the intervening valleys may be either entirely open, or blocked by accessory tubercles, or completely filled with cement[1].

Family DINOTHERIIDÆ.

All the teeth of the permanent series are in use at the same time, the premolars succeeding the milk-molars in the normal manner. In the one known genus none of the cheek-teeth have cement, or carry more than three ridges: in the true molars these ridges are continuous and the valleys open; but in the upper premolars the former are more or less interrupted, and are connected by a longitudinal external ridge, a similar submedian ridge occurring in the lower premolars. This lophodont structure of the premolars is a character connecting *Dinotherium* with the Perissodactyla, and is not improbably evidence of their original community of descent. In section the incisors do not present decussating striæ. The upper cheek-teeth of *Dinotherium giganteum* are figured in the accompanying woodcut.

Fig. 1.



Dinotherium giganteum.—The left upper cheek-dentition; from the Middle Miocene of Samaran (Gers), France. ¼. *p*, premolars; *a*, true molars. (After Gaudry's 'Enchaînements.')

[1] For other characters see Marsh, 'Monograph of the Dinocerata,' pp. 174–5 (1884), and Flower, 'Encyclopædia Britannica,' 9th ed. vol. xv. pp. 423–5 (1883).

Genus **DINOTHERIUM**, Kaup[1].

Syn. *Antoletherium*, Falconer[2].

Dentition:—I. $\frac{0\,(?)}{1}$, C. $\frac{0}{0}$, Pm. $\frac{2}{2}$, M. $\frac{3}{3}$. Three milk-molars are present in the lower (*infrà*, p. 8, No. 33519), and therefore probably in the upper jaw. The number of ridges in the cheek-teeth is Mm. $\frac{2.2.3}{2.2.3}$, Pm. $\frac{2.2}{2.2}$, M. $\frac{3.2.2}{3.2.2}$. The symphysis of the mandible is deflected, and the lower incisors are of very large size.

Dinotherium giganteum, Kaup[3] (*ex* Cuv.).

Including *Dinotherium cuvieri*, Kaup[4].
Dinotherium medium, Kaup[5].
Dinotherium bavaricum, H. v. Meyer[6].
Dinotherium proavum, Eichwald[7].
Dinotherium kœnigi, Kaup[8].

Although there is a great variation in the size of the specimens included under this specific head, yet the transition from one to the other is so gradual that they cannot apparently be specifically distinguished[9]. It must, however, be borne in mind that the simple structure of the teeth admits of but scarcely any modification, and therefore that there is a possibility of these variations in size really indicating the existence of more than one European species.

Hab. Europe. The species ranges in time from the Middle Miocene of France to the Lower Pliocene of Pikermi and the Vienna basin (Congerian stage); and has a very wide range in space, having been recorded from Germany, Switzerland, France, Spain, Austria-Hungary, Greece, Styria, and Russia[10].

40361. (*Fig.*) The cranium and cast of the mandible (woodcut, fig. 2); the former was obtained in 1835 by Klipstein from the ossiferous sand of Eppelsheim, Hessen-Darmstadt, and is described and figured by Klipstein and Kaup in a 4to memoir entiled 'Beschreibung und Abbildungen von dem

[1] Isis, vol. xxii. p. 401 (1829) (*ex* Cuv. 1822. *Tapir gigantesque*).
[2] Palæontological Memoirs, vol. i. p. 416 (1868).
[3] Isis, vol. xxii. p. 401 (1829).
[4] Oss. Foss. d. Darmstadt, pt. 1, p. 14 (1832).
[5] Neues Jahrb. 1833, p. 419.
[6] Nova Acta Ac. Cæs. Leop.-Car. vol. xvi. pt. 2, p. 487 (1833). This name is a synonym of *D. cuvieri*.
[7] *Ibid.* vol. xvii. pt. 2, p. 741 (1835).
[8] Akten der Urwelt, pt. i. p. 19 (1841).
[9] See Weinsheimer, Pal. Abhandl. vol. i. pt. 3 (1883).
[10] See Weinsheimer, *op. cit.* pp. 65–73.

in Rheinhessen gefundenen colossalen Schädel des Dinotherii gigantei' (1836)[1]; the original of the latter is also from Eppelsheim, and is preserved in the Museum at Darmstadt. *Purchased*, 1869.

Fig. 2.

Dinotherium giganteum.—Skull; from the bone-sand of Eppelsheim, Hessen-Darmstadt. Much reduced.

M. 3494. The anterior portion of the palate, showing the premolars and m. 1 of both sides; from Eppelsheim.
Purchased, 1851.

1270. Cast of the anterior part of the palate, showing the right pm. 3, and the left pm. 3 and pm. 4. The original is from Eppelsheim, and is figured by Kaup in the Oss. Foss. d. Darmstadt, pt. 1, pl. i. *bis*, fig. 2.
Purchased. Before 1836.

1271. Cast of the palate of a young individual, showing mm. 3, mm. 4,

[1] A French translation of this memoir was published in Paris in 1837.

and m. 1 of both sides. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. i.
Purchased. Before 1836.

1240. Fragment of the left maxilla, showing the three true molars; from Eppelsheim. *Purchased. Before* 1836.

1735. Cast of part of the right maxilla containing the three true molars. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. ii. fig. 1. *Purchased. Before* 1836.

41838. Cast of a portion of the left maxilla, showing the five cheek-teeth. The original is from the Middle Miocene of Grive-St. Alban (Isère), France. *Purchased*, 1869.

41839. Cast of part of the left maxilla, showing pm. 3, pm. 4, and m. 1. The original is from the Middle Miocene of St. Donat (Drome), France. *Purchased*, 1869.

41840. Cast of a fragment of the left maxilla of a small individual, showing m. 1 and m. 2. The original is from the Middle Miocene of Blois (Loir-et-Cher), France.
Purchased, 1869.

33520. Fragment of the right maxilla of a small immature individual, showing mm 4, m. 1, and pm. 4 *in alveolo*; from the Middle Miocene of Sansan (Gers), France.
Purchased, 1858.

1735 a. Cast of the germ of the third left upper premolar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. iii. fig. 5. The two inner columns are united.
Purchased. Before 1836.

1735 o. Cast of the third left upper premolar. The original is from Eppelsheim. *Purchased. Before* 1836.

1272. Cast of a worn third left upper premolar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. ii. fig. 6. *Purchased. Before* 1836.

1243. An imperfect third left upper premolar; from Eppelsheim.
Purchased. Before 1836.

1735 b. Cast of the third right upper premolar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. ii. fig. 5.
Purchased. Before 1836.

36762. The third right upper premolar; from Eppelsheim.
Purchased, 1858.

19432 h. The worn third right upper premolar; from Eppelsheim. *Purchased,* 1845.

1749. Cast of the third right upper premolar of a small individual. The original is from Eppelsheim. *Purchased. Before* 1836.

1735 c. Cast of the germ of the fourth left upper premolar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. iii. fig. 4. *Purchased. Before* 1836.

1273. Cast of the fourth left upper premolar. The original is from Eppelsheim. *Purchased. Before* 1836.

27474. The fourth left upper premolar; from Eppelsheim. *Hastings Collection. Purchased,* 1855.

41841. Cast of the fourth left upper premolar, of very large size. The original is from the Middle Miocene of Jean-le-Vieux (Ain), France, and is preserved in the Museum of Natural History at Lyons. *Purchased,* 1869.

1735 e. Cast of the fourth left upper premolar. The original is from Eppelsheim. *Purchased. Before* 1836.

1735 d. Cast of the much-worn fourth right upper premolar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. ii. fig. 4. *Purchased. Before* 1836.

1747. Cast of the fourth left upper premolar of a small individual. The original is from Eppelsheim. *Purchased. Before* 1836.

1748. Cast of the fourth right upper premolar, agreeing in size with the preceding specimen. The original is from Eppelsheim. *Purchased. Before* 1836.

18755 h. The first left upper true molar; from Eppelsheim. *Purchased,* 1845.

1743. Cast of the first left upper true molar. The original is from Eppelsheim. *Purchased. Before* 1836.

1242. The first right upper true molar; from Eppelsheim. *Purchased. Before* 1836.

1739. Cast of the first right upper true molar. The original is from Eppelsheim. *Purchased. Before* 1836.

M. 156. The second right upper true molar; from Eppelsheim. *Enniskillen Collection. Purchased*, 1882.

19432 a. The second right upper true molar; from Eppelsheim. *Purchased*, 1845.

19432 f. The second left upper true molar; from Eppelsheim. *Purchased*, 1845.

1742. Cast of the second left upper true molar. The original is from Eppelsheim. *Purchased. Before* 1836.

19432. An imperfect second left upper true molar; from Eppelsheim. *Purchased*, 1845.

7429. Cast of the third left upper true molar of a small individual (*D. cuvieri*). The original is from the Middle Miocene of Chevilly, near Orleans (Loiret), France, and is figured by Cuvier in the 'Ossemens Fossiles,' 2nd edit. vol. ii. pt. i. pl. iv. fig. 1, under the name of *Tapir gigantesque*. *Mantell Collection. Purchased*, 1836.

15292. The third left upper true molar; from Eppelsheim. *Purchased*, 1842.

1280. An imperfect third right upper true molar; from Eppelsheim. *Purchased. Before* 1836.

M. 158. A crushed third right upper true molar; from Eppelsheim. *Enniskillen Collection. Purchased*, 1882.

32529. The third right upper true molar of a small individual; from the Middle Miocene of Touraine, France. *Tesson Collection. Purchased*, 1857.

21270. The first ridge of a third left upper true molar of very large size; from Eppelsheim. *Purchased*, 1847.

1754 a. Cast of the fourth left upper milk-molar. The original is from Eppelsheim. *Purchased. Before* 1836.

1275, 1542. Cast of the symphysis and left ramus of the mandible, showing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. i.*bis*, fig. 5. *Purchased. Before* 1836.

1276. Cast of the left ramus of the mandible of an immature individual, showing the incisor and the first four cheek-teeth.

The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. ii.*bis*, figs. 1, 1 *a*. *Purchased. Before* 1836.

1274. Cast of the symphysis and the left ramus of the mandible, showing all the dentition. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. i.*bis*, fig. 1. *Purchased. Before* 1836.

M. 154. Part of the left ramus of the mandible, containing all the cheek-teeth except $\overline{\text{pm. 3}}$; from Eppelsheim. *Enniskillen Collection. Purchased,* 1882.

M. 155. Fragment of the right ramus of the mandible, containing $\overline{\text{pm. 4}}$, $\overline{\text{m. 1}}$, and $\overline{\text{m. 2}}$; from Eppelsheim. *Enniskillen Collection. Purchased,* 1882.

M. 2906. Hinder part of the left ramus of the mandible, showing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Eppelsheim. *Purchased.*

33519. The greater part of the mandible of a young individual, showing the incisors, the three milk-molars, $\overline{\text{m. 1}}$, and $\overline{\text{m. 2}}$ *in alveolo* ; from Sansan. This specimen belongs to the same individual as No. 33520. *Purchased,* 1858.

29632–3. Casts of portions of the two mandibular rami of a small individual, showing all the cheek-teeth except $\overline{\text{pm. 3}}$. The original, which belongs to Kaup's *D. cuvieri*, is preserved in the Paris Museum of Natural History, and was found at Chevilly ; it is noticed and figured by P. Gervais in the 'Zool. et Pal. Françaises,' 2nd edit. pp. 70, 71, figs. 14, 15. *Hastings Collection. Purchased,* 1855.

M. 153. An incisor ; from Eppelsheim. *Enniskillen Collection. Purchased,* 1882.

1277. An incisor ; from Eppelsheim. *Purchased. Before* 1836.

1736. Cast of the third left lower premolar. The original is from Eppelsheim. *Purchased. Before* 1836.

48041. Cast of the third left lower premolar. The original is from Eppelsheim. *Purchased. Before* 1836.

M. 160. The third left lower premolar ; from Eppelsheim. *Enniskillen Collection. Purchased,* 1882.

36989. The third left lower premolar of a small individual; probably from the Miocene of Würtemberg.
Purchased. About 1860.

19432 d. The third right lower premolar; from Eppelsheim.
Purchased, 1845.

19432 e. The third right lower premolar; from Eppelsheim.
Purchased, 1845.

1735 s. Cast of the third right lower premolar. The original is from Eppelsheim. *Purchased. Before* 1836.

1740. Cast of the third right lower premolar. The original is from Eppelsheim. *Purchased. Before* 1836.

36988. The third right lower premolar of a small individual; from the Miocene near Triebitz, Bohemia.
Purchased. About 1860.

1244. A much-worn third right lower premolar; from Eppelsheim.
Purchased. Before 1836.

21271. A much-worn third lower premolar; from Eppelsheim.
Purchased, 1847.

M. 267. A worn and imperfect third left lower premolar; from Eppelsheim. *Egerton Collection. Purchased*, 1882.

19432 c. The fourth right lower premolar; from Eppelsheim.
Purchased, 1845.

21489. The fourth left lower premolar, of very large size; from Eppelsheim. *Purchased*, 1847.

19432 b. The first right lower true molar; from Eppelsheim.
Purchased, 1845.

15291. The first right lower true molar; from Eppelsheim. Figured (*Fig.*) by Kaup, *op. cit.* pl. iii. fig. 7. *Purchased*, 1842.

1735 i. Cast of the germ of the first left lower true molar. The original is from Eppelsheim. *Purchased. Before* 1836.

7430. Cast of the first left lower true molar of a small individual. The original is from Chevilly, and is figured by Cuvier in the 'Ossemens Fossiles,' 2nd ed. vol. ii. pt. i. pl. iv. fig. 5, under the name of *Tapir gigantesque*; it agrees in size with $\overline{\text{m. 3}}$ of No. 29632.
Mantell Collection. Purchased, 1836.

21269. The second right lower true molar, of very large size; from Eppelsheim. *Purchased*, 1847.

27475. An imperfect second right lower true molar; from Eppelsheim. *Hastings Collection. Purchased*, 1855.

1753. Cast of the second right lower true molar. The original is from Eppelsheim. *Purchased. Before* 1836.

1278. Cast of the second right lower true molar. The original is probably from Chevilly. *Purchased.*

27403. The second right lower true molar of a very small individual; from the Middle Miocene of St. Germain, near Saminu, France. *No history.*

1735 d. Cast of the second left lower true molar. The original is from Eppelsheim. *Purchased. Before* 1836.

1735 n. Cast of the second left lower true molar. The original is from Eppelsheim. *Purchased. Before* 1836.

1245. (*Fig.*) The third right lower true molar, longitudinally bisected; from Eppelsheim. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. iii. fig. 12, and in 'Falconer's Palæontological Memoirs,' vol. i. pl. vii. fig. 3 (as $\overline{\text{m. 2}}$). *Purchased. Before* 1836.

41218. The third right lower true molar; from the Middle Miocene of the Canton d'Aurignac (Haute-Garonne), France. The hind talon is of very large size. *Purchased*, 1868.

M. 157. The third right lower true molar; from Eppelsheim. *Enniskillen Collection. Purchased*, 1882.

1746. Cast of the third left lower true molar. The original is from Eppelsheim. *Purchased. Before* 1836.

1735 t. Cast of the third left lower true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. iii. fig. 6; it is of very large size, and the talon relatively small. *Purchased. Before* 1836.

1735 m. Cast of the fourth left lower milk-molar. This specimen, the original of which is from Eppelsheim, agrees very closely with $\overline{\text{mm. 4}}$ of No. 33519. *Purchased. Before* 1836.

The following specimens, the originals of which are from Eppelsheim, belong either to the present species or to Mastodon longirostris; *it is said that Kaup was inclined to refer them to the former.*

1544. Cast of the imperfect right femur. *Purchased. Before* 1836.

M. 2948–9. Cast of a calcaneum and unciform.
Purchased. Before 1836.

Dinotherium indicum, Falconer[1].

Including:—*Dinotherium pentapotamiæ,* Lydekker[2] (*ex* Falconer).
Syn. *Antoletherium,* Falconer[3].

Since the difference in size between *D. indicum* and *D. pentapotamiæ* is not greater than the variation obtaining in the forms included under the head of *D. giganteum*, the two are provisionally classed together. Both have been identified by Weinsheimer[4] with the European species; but there appear to be slight differences[5] in the teeth, which may be of specific value. Thus $\underline{\text{pm. 3}}$ and $\overline{\text{pm. 3}}$ do not agree exactly with those of the latter species, while in the mandible ('Palæontologia Indica,' ser. 10, vol. i. pls. xxix., xxx.) the low longitudinal bridge connecting the transverse ridges of the true molars is relatively more developed, so that the worn first and second ridges of $\overline{\text{m. 1}}$ are connected by a bridge of dentine before those of $\overline{\text{pm. 4}}$ are so connected, while the dentition islet of the third ridge of $\overline{\text{m. 1}}$ is of a regular elliptic form. One specimen seems, moreover, to indicate a characteristic difference in the form of the incisors[6].

Hab. India.

40919. Cast of the third right upper premolar. The originals of this and the next specimen are the types of *D. penta-*

[1] Quart. Journ. Geol. Soc. vol. i. p. 361 (1845).

[2] Palæontologia Indica (Mem. Geol. Surv. Ind.), ser. 10, vol. i. p. 72 (1876).

[3] Palæontological Memoirs, vol. i. p. 416, pl. xxxiv. figs. 1, 2 (1868).

[4] Pal. Abhandl. vol. i. pt. 3 (1883).

[5] The opportunity of comparing the figures of the Indian specimens given in the 'Palæontologia Indica,' *op. cit.*, with the European ones, has shown the writer that many of the differences there indicated are not of more than individual value.

[6] Falconer (see 'Palæontological Memoirs,' vol. i. p. 408) observes:—"In corroboration of this view [*i. e.* the specific distinctness of the Indian *Dinotherium*] it deserves to be stated that, of the numerous Proboscidea discovered in India, we have found that all the forms are specifically distinct from those which occur in Europe." The subsequent discovery of *M. angustidens* on the north-west frontier is hardly an exception to this generalization.

potamiæ, and were obtained from the Siwaliks of Khushálgarh, Punjab; they are preserved in the Indian Museum, Calcutta (Nos. A 1, A 2[1]). The original of this specimen is figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. ix. fig. 1. It agrees in size with pm. 3 of *D. giganteum* (No. 1749); but differs from that and the other homologous teeth by the almost total absence of the ridge connecting the antero-internal column with the outer wall and by the form of the anterior cingulum. *Presented by C. Falconer, Esq.*, 1867.

40919 a. Cast of the imperfect first right upper true molar. The original was associated with that of the preceding specimen, and is figured by the writer, *op. cit.* pl. ix. fig. 2. *Presented by C. Falconer, Esq.*, 1867.

40775. The imperfect second right upper true molar; from the Siwaliks of Perim Island, Gulf of Cambay, India. This specimen is of very large size, and presents no characters by which it can be distinguished from m. 2 of *D. giganteum*. *Presented by C. Falconer, Esq.*, 1867.

M. 3437. The slightly worn first ridge of the second left upper true molar; from Perim Island. This specimen agrees in size with the preceding. *Presented by Col. J. W. Watson*, 1886.

14739 a. (*Fig.*) The middle portion of the left ramus of the mandible, with the crowns of the teeth hammered off; from Perim Island. This specimen is described by Falconer in the Quart. Journ. Geol. Soc. vol. i. p. 361, and is figured in the 'Fauna Antiqua Sivalensis,' pl. xxxv. fig. 6, and also in 'Falconer's Palæontological Memoirs,' vol. i. pl. xxxiii. fig. 5; it is of great vertical depth and thickness, and agrees in the former respect with a mandible of *D. giganteum* from Bohemia, figured by Weinsheimer, *op. cit.* pl. i. fig. 1 and pl. ii. fig. 7. *Presented by Miss Pepper. Before* 1846.

40937. The imperfect third left lower premolar; from the Siwaliks of Nurpúr, India. This tooth is of large size, and differs from pm. 3 of *D. giganteum* by the smallness of the postero-internal and the absence of the antero-internal column, No. 1735 *s* coming nearest in this respect. *Presented by Professor T. H. Huxley*, 1868.

[1] See Lydekker, Cat. Siwalik Vert. Ind. Mus. Calcutta, part i. pp. 104, 105 (1885).

14756. The hinder ridge and talon of the second left lower true (*Fig.*) molar; from Perim Island. This specimen is the type of the species, and is described and figured by Falconer in the Quart. Journ. Geol. Soc. vol. i. p. 361, pl. xiv. fig. 1, and is also figured in the 'Fauna Antiqua Sivalensis,' pl. iii. fig. 11, and in 'Falconer's Palæontological Memoirs,' vol. i. pl. vi. fig. 3. *Presented by Miss Pepper. Before* 1846.

1278. Cast of a cervical vertebra. The original was obtained from Perim Island, but it is not known where it is preserved; it is referred to this species on the authority of Falconer. *No history.*

40845. A cast, apparently made from a portion of an incisor. This specimen is labelled in Falconer's handwriting "*Dinotherium indicum*. Perim. Cast.—Duckworth." If rightly determined, it apparently indicates that the anterior border of the tooth was much sharper than in *D. giganteum*. *Presented by C. Falconer, Esq.*, 1867.

Family ELEPHANTIDÆ.

The teeth of the milk- and true molar series succeed one another in a horizontal direction, and, at the most, there are never more than portions of three such teeth in use at the same time. Milk-molars are always present, and are usually three in number; but it is probable that a fourth (mm. 1) is occasionally developed. Premolars may be absent or present; when present there are usually two on either side of each jaw, but in the North-American *Mastodon productus*[1] there appear to be three such teeth. There are never less than three ridges in mm. 4, m. 1, and m. 2[2]; and m. 3 always has one or more ridges in excess of m. 2. The cheek-teeth may have but few low transverse ridges with open valleys, or these ridges may be divided into columns having a somewhat alternate arrangement, or they may be very numerous and developed into tall thin plates, with the intervening spaces entirely filled with similar plates of cement A median longitudinal cleft is present in the cheek-teeth of the less specialized forms. The upper cheek-teeth are always convex antero-

[1] See Lydekker, 'Palæontologia Indica' (Mem. Geol. Surv. Ind.), ser. 10 vol. i. p. 200.

[2] These three teeth are frequently termed the "intermediate molars."

posteriorly, while the lower are concave. Incisors are always present in the upper jaw, and may or may not be present in the mandible; in section, their dentine displays decussating striæ.

Genus **MASTODON,** Cuvier[1].

Including:—*Trilophodon* and *Tetralophodon*, Falconer[2].
Dibelodon and *Tetrabelodon*, Cope[3].

Dentition:—I. $\frac{1}{(0-1)}$, C. $\frac{0}{0}$, Mm. $\frac{3}{3}$, Pm. $\frac{(0-3)}{(0-3)}$, M. $\frac{3}{3}$. The upper incisors are large, and may have longitudinal bands of enamel. The lower incisors (when present) vary considerably in size, and are always smaller than the upper. The cheek-teeth carry transverse ridges, which may be entire or may be divided into distinct inner and outer columns with a more or less alternate arrangement; outlying tubercles may be present in the intervening valleys, which are frequently entirely devoid of cement, and are never entirely filled by it. The "intermediate" molars usually have an isomerous ridge-formula, the number of ridges varying from three to five. The ridges are always bisected by a median cleft traversing the long axis of the crown; and the plane of wear of the crowns of the teeth is oblique, that of the upper jaw inclining from the outer to the inner side, and the reverse obtaining in the lower. Three cheek-teeth may be in use at the same time. Premolars may or may not be present; and the crowns of the lower cheek-teeth are taller and narrower than those of the upper. The cranium is usually less elevated than in *Elephas*, and the mandibular symphysis may be very long.

The line of specialization in the dentition consists in the shortening of the mandibular symphysis and disappearance of the lower incisors, in the disappearance of the premolars, in the increase in the absolute size and relative width of the cheek-teeth, and in the number and height of their ridges, and the amount of cement. It is difficult to say whether the form of tooth with continuous ridges, or that in which the ridges are divided into distinct columns, is the more primitive, as both types (*M. turicensis* and *M. angustidens*) occur in the Middle Miocene, and both persisted into the Pliocene and Pleistocene (*M. americanus* and *M. arvernensis*). *M. turicensis* passes, however, into *M. angustidens*; and it appears that, starting from the latter generalized species, two branches of more specialized forms

[1] Ann. d. Muséum, vol. viii. p. 270 (1806).
[2] Quart. Journ. Geol. Soc. vol. xiii. p. 313 (1857). As subgenera.
[3] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).

may be traced—the one (in which there is a tendency of the valleys of the molars to be much blocked and their columns to be ranged alternately) passing through *M. pandionis* and *M. perimensis* to *M. sivalensis* and *M. arvernensis*, and the other (in which the valleys remain more open and the columns of the ridges run straight across the crowns) passing through *M. longirostris* and *M. latidens* to *Elephas clifti*, and then through the higher stegodont forms to the true Elephants ; while there are signs that some of the middle forms of these two branches were mutually connected.

The genus has been divided into groups by Falconer according to the number of ridges in the cheek-teeth ; and this division indicates the degree of evolution of its members. Cope [1] proposes to split the genus into three (*Mastodon*, *Dibelodon*, and *Tetrabelodon*), according to the presence or absence of enamel-bands in the upper incisors, and of lower incisors ; but such division, even if it can be made, directly traverses the evolutionary grouping of Falconer.

A. *Trilophodont Group.*

The " intermediate " molars usually carry three, and the last molar four ridges, the full ridge-formula being :—Mm. $\frac{1.2.3}{1.2.3}$, M. $\frac{3.3.3.}{3.3.3}$.

Mastodon americanus (Cuvier [2]).

Syn.[3] *Elephas americanus*, Cuvier [4].
Mammuth ohioticus, Blumenbach [5].
Mastodon giganteus, Cuvier [6].
Mastodon maximus, Cuvier [7].
Tetracaulodon mastodontoideus, Godman [8].
Tetracaulodon brevirostris, Kaup [9].
Mastodon jeffersoni, Hays [10].
Mastodon cuvieri, Hays [11].

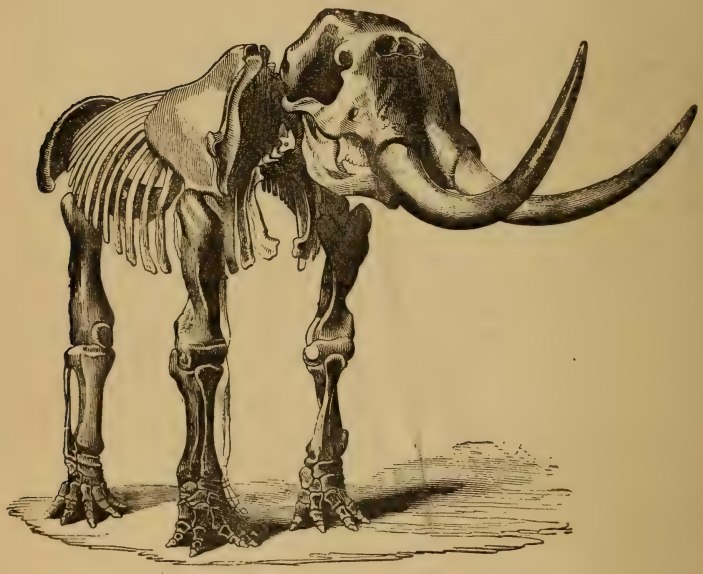
The valleys of the molars are completely open, and the transverse ridges straight, but with a distinct median longitudinal cleft ; the worn

[1] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).
[2] Table Elém. d'Hist. Nat. p. 149 (1798), *Elephas*.
[3] For fuller synonymy, see Leidy, Journ. Ac. Nat. Sci. Philad. ser. 2, vol. vii. p. 392 (1869).
[4] *Loc. cit.*
[5] Handbuch d. Naturgeschichte, 6th edit. p. 698 (1799).
[6] Règne Animal, 1st ed. vol. i. p. 233 (1817).
[7] Ossemens Fossiles, 2nd ed. vol. v. pt. 2, p. 527 (1824).
[8] Trans. Amer. Phil. Soc. ser. 2, vol. iii. p. 484 (1830).
[9] Isis, vol. xxv. p. 630 (1832).
[10] Trans. Amer. Phil. Soc. ser. 2, vol. iv. p. 334 (1834).
[11] *Loc. cit.*

dentine-islets present trefoils on one side of each tooth; and the upper molars are cingulated. The mandibular symphysis is short and spout-like, and usually edentulous in the adult, although two small incisors are frequently present in the young, one of which is occasionally retained in (probably male) adult individuals. In one variety the enamel of the cheek-teeth is rugose, while in another it is smooth; a small quantity of cement is present in the valleys of the cheek-teeth; premolars were apparently not developed.

Hab. North America.

Fig. 3.



Mastodon americanus; from the Pleistocene of Missouri. Much reduced.

*. The skeleton of an adult (woodcut, fig. 3) made up from the bones (*Fig.*) of several individuals, the incisors and some of the bones being casts; from the Pleistocene of Benton County, Missouri, U.S.A. This specimen was brought to London by Koch in 1843, and is figured in pl. i. of Warren's memoir on *Mastodon giganteus* (1852). *Purchased. About* 1844.

345. The cranium, imperfect superiorly, showing m. 3 of either side,

and the alveoli of m. 2 and the incisors; from the Pleistocene of "Big-Bone-Lick," Kentucky, U.S.A.

Purchased[1]. *About* 1836.

17144. The palatal half of the cranium, showing the left incisor and m. 2 and m. 3; from Missouri. *Purchased. About* 1844.

M. 2849. Cast of the cranium and the mandible of an immature individual, showing mm. 4, m. 1, and m. 2 *in alveolo* in both jaws; there are no traces of lower incisors. The original is from the Pleistocene of New Jersey, U.S.A.; and is apparently the one figured in pls. iii. and iv. of Warren's memoir on *M. giganteus* (1852).

Presented by J. C. Warren, Esq., M.D., 1852.

17155. Palate of a young individual, showing mm. 3, mm. 4, and m. 1; from Missouri. *Purchased. About* 1844.

40977. Cast of the left half of the brain-cavity of an immature individual; from a specimen found in the Pleistocene of Fort Wayne, Indiana, U.S.A.

Presented by the Chicago Academy of Sciences.

17309. Palate, showing the left m. 2 and m. 3 and the right m. 3; from Missouri. *Purchased. About* 1844.

17415. Palate, with m. 1 and m. 2 of both sides; from Missouri. *Purchased. About* 1844.

17362. Hinder part of the palate, with m. 3 of both sides; from Missouri. *Purchased. About* 1844.

44791. Part of the palate of a small individual, with the left m. 2 and m. 3; from the Pleistocene of Ohio, U.S.A.

Purchased.

17397. Part of the right maxilla, with m. 2 and m. 3; from Missouri. *Purchased. About* 1844.

17364. Part of the right maxilla, with m. 2 and m. 3; from Missouri. *Purchased. About* 1844.

342. The right half of the palate, with m. 3; from "Big-Bone-Lick." *Purchased. About* 1836.

[1] The specimens 333–345 (together with M. 147, M. 380, M. 451) were originally in Bullock's Museum, and were respectively purchased by the British Museum, Sir Philip Egerton, Bart., and the Earl of Enniskillen (then Viscount Cole) at the sale of that collection.

17422. Part of the right maxilla, with m. 2; from Missouri.
Purchased. About 1844.

17379. Part of the left maxilla, with m. 2; from Missouri.
Purchased. About 1844.

17363. Fragment of the left maxilla, showing m. 2; from Missouri. *Purchased. About* 1844.

17381. (*Fig.*) Fragment of the right maxilla, containing the unworn m. 2; from Missouri. This specimen is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xl. fig. 16[1].
Purchased. About 1844.

17423. Fragment of the left maxilla, containing the partially worn m. 2; from Missouri. *Purchased. About* 1844.

17358. Part of the left maxilla, with the unworn m. 2 and m. 3; from Missouri. *Purchased. About* 1844.

17408. Part of the right maxilla, with the three true molars; from Missouri. *Purchased. About* 1844.

17411. Fragment of the left maxilla, with m. 1; from Missouri.
Purchased. About 1842.

17412. Fragment of the left maxilla, with m. 1; from Missouri.
Purchased. About 1844.

M. 146. Fragment of the left maxilla, with m. 1; from "Big-Bone-Lick." *Enniskillen Collection. Purchased*, 1882.

17310. Part of the right maxilla, with mm. 4 and m. 1; from Missouri. *Purchased. About* 1844.

17565. The second right upper milk-molar; from Missouri.
Purchased. About 1844.

17566. The third right upper milk-molar; from Missouri.
Purchased. About 1844.

40785. The third left upper milk-molar; from the Pleistocene of the Osage river, Missouri.
Presented by C. Falconer, Esq., 1867.

17567. The fourth right upper milk-molar; from America.
Purchased. About 1844.

[1] In the description of the plate the specimen is erroneously entered as the imperfect m. 3.

17418. The fourth right upper milk-molar; from Missouri. Both in this and the preceding specimen the third ridge is more worn than the first. *Purchased. About* 1844.

17389. The first left upper true molar; from Missouri. *Purchased. About* 1844.

17332. The first left upper true molar, well worn; from Missouri. *Purchased. About* 1844.

17391. The first left upper true molar; from Missouri. The third ridge is more worn than the first. *Purchased. About* 1844.

17438. The first right upper true molar, almost unworn; from Missouri. *Purchased. About* 1844.

17331. The first right upper true molar; from Missouri. *Purchased. About* 1844.

17341. The much-worn first right upper true molar; from Missouri. *Purchased. About* 1844.

17388. The germ of the second right upper true molar; from Missouri. *Purchased. About* 1844.

335. The germ of the second right upper true molar; from "Big-Bone-Lick." *Purchased. About* 1836.

17387. The second right upper true molar, with the summit of the first ridge slightly abraded. *Purchased. About* 1844.

17333. The second right upper true molar, with the first and second ridges worn; from Missouri. *Purchased. About* 1844.

17417. The second right upper true molar, with all the ridges worn; from Missouri. *Purchased. About* 1844.

336. The second right upper true molar, in a more worn condition; from "Big-Bone-Lick." *Purchased. About* 1836.

M. 380. The second right upper true molar, in a similar stage of wear; from "Big-Bone-Lick." *Egerton Collection. Purchased*, 1882.

7439. The second right upper true molar, in a similar stage of wear; from "Big-Bone-Lick." *Mantell Collection. Purchased*, 1836.

13 (O. C.). The second right upper true molar, in a much-worn condition; from "Big-Bone-Lick." *Purchased.*

17373. The germ of the second left upper true molar; from Missouri. *Purchased. About* 1844.

M. 451. The second left upper true molar; from "Big-bone-Lick." *Enniskillen Collection. Purchased*, 1882.

17312. The second left upper true molar; from Missouri. *Purchased. About* 1844.

17334. The germ of the third right upper true molar; from Missouri. *Purchased. About* 1844.

17367. The third right upper true molar, unworn; from Missouri. *Purchased. About* 1844.

17393. The germ of the third right upper true molar; from Missouri. *Purchased. About* 1844.

17326. The third right upper true molar, with the first ridge slightly worn; from Missouri. The fourth ridge and the hind talon are very small. *Purchased. About* 1844.

17324. The third right upper true molar, in an early stage of wear; from Missouri. The fourth ridge is very large, and the hind talon double, so that the specimen might be described as having five ridges and a talon. *Purchased. About* 1844.

M. 451 a. The third right upper true molar (imperfect); from "Big-Bone-Lick." This tooth agrees in character with No. 17326. *Enniskillen Collection. Purchased*, 1882.

17366. The germ of the third left upper true molar; from Missouri. *Purchased. About* 1844.

17403. The germ of the third left upper true molar; from Missouri. This specimen is much smaller than the preceding, and the ridges are placed closer together. *Purchased. About* 1844.

7437. The much-worn third left upper true molar; from Ohio. *Mantell Collection. Purchased*, 1836.

12 (O. C.). A third upper true molar; from North America. This tooth belonged to a very old animal, and is worn in an abnormal manner. *Purchased.*

17420. The third left upper true molar, longitudinally bisected; (*Fig.*) from Missouri. This specimen is figured in section by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. iii. fig. 9, and in 'Falconer's Palæontological Memoirs,' vol. i. pl. vii. fig. 2. *Purchased. About* 1844.

17395, 17288–94. Eight upper incisors, mostly imperfect; from Missouri. *Purchased. About* 1844.

17147. The mandible, showing the three true molars of either side; the right incisor is present; from Missouri. *Purchased. About* 1844.

17346. The mandible, showing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$ of both sides; from Missouri. *Purchased. About* 1844.

17146. The mandible, showing the three true molars of both sides; from Missouri. *Purchased. About* 1844.

17426. The mandible, with $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$ of both sides; from Missouri. *Purchased. About* 1844.

17306. The mandible, showing $\overline{\text{m. 1}}$, $\overline{\text{m. 2}}$, and $\overline{\text{m. 3}}$ *in alveolo* of both sides; from Missouri. *Purchased. About* 1844.

17185. The greater part of the mandible of a young individual, showing $\overline{\text{mm. 3}}$, $\overline{\text{mm. 4}}$, and $\overline{\text{m. 1}}$ of both sides; from Missouri. *Purchased. About* 1844.

343. The left ramus of the mandible, with $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from (*Fig.*). "Big-Bone-Lick." Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxxv. figs. 4, 5. *Purchased. About* 1836.

17355. Hinder part of the left ramus of the mandible, with $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

17347. Part of the left ramus of the mandible, with $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

17150. Fragment of the left ramus of the mandible, with $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

17357. Fragment of the left ramus of the mandible, with $\overline{\text{m. 2}}$; from Missouri. *Purchased. About* 1844.

17398. Fragment of the left ramus of the mandible, with $\overline{\text{m. 1}}$ and $\overline{\text{m. 2}}$; from Missouri. *Purchased. About* 1844.

M. 147. Part of the left ramus of the mandible, with $\overline{\text{m. 1}}$ and $\overline{\text{m. 2}}$; from "Big-Bone-Lick." *Enniskillen Collection. Purchased*, 1882.

3 (O. C.). The right ramus of the mandible, with $\overline{\text{m. 3}}$; from Ohio. (*Fig.*) This specimen is described and figured by Hunter in the Phil. Trans. vol. lviii. p. 34 *et seq.* pl. iv. figs. 1, 3 (1768). *Presented by the Earl of Shelburne*, 1768.

17148. Part of the right ramus of the mandible, with $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

17073. Part of the right ramus of the mandible, with $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

17396. Part of the right ramus of the mandible, with the unworn $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

17352. Part of the right ramus of the mandible, with $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

17348. Part of the right ramus of the mandible, showing $\overline{\text{m. 1}}$ and $\overline{\text{m. 2}}$; from Missouri. *Purchased. About* 1844.

17353. Fragment of the right ramus of the mandible, with $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

17356. Fragment of the right ramus of the mandible, with $\overline{\text{m. 3}}$; from Missouri. *Purchased. About* 1844.

40786. The second right lower milk-molar; from "Big-Bone Lick." *Presented by C. Falconer, Esq.*, 1867.

17562. The second right lower milk-molar; from Missouri. *Purchased. About* 1844.

17563. The third right lower milk-molar; from Missouri. *Purchased. About* 1844.

17564. The fourth right lower milk-molar; from Missouri. *Purchased. About* 1844.

17342. The fourth right lower milk-molar; from Missouri. *Purchased. About* 1844.

40784. The fourth left lower milk-molar; from the Osage river. *Presented by C. Falconer, Esq.*, 1867.

17402. The first right lower true molar, in an early condition of wear; from Missouri. *Purchased. About* 1844.

M. 3496. The first right lower true molar, in a much-worn condition; from North America. *No history.*

17329. The first left lower true molar, in an early stage of wear; from Missouri. *Purchased. About* 1844.

17343. The first left lower true molar, in an advanced stage of wear; from Missouri. *Purchased. About* 1844.

17313. The first or second right lower true molar; from Missouri. The third ridge is more worn than the first.
Purchased. About 1844.

M. 2850. The second right lower true molar, almost unworn; from "Big-Bone-Lick."
Presented by Prof. Sir R. Owen, K.C.B., 1859.

17336. The second right lower true molar, in a half-worn condition; from Missouri. *Purchased. About* 1844.

M. 150. The unworn second left lower true molar; from "Big-Bone-Lick." *Enniskillen Collection. Purchased,* 1882.

337. The second left lower true molar, in a half-worn condition; from "Big-Bone-Lick." *Purchased.*

17322. The second left lower true molar, longitudinally and vertically bisected; from Missouri. *Purchased. About* 1844.

40782. The second left lower true molar; from "Big-Bone-Lick."
Presented by C. Falconer, Esq., 1867.

338. The third right lower true molar; from "Big-Bone-Lick."
Purchased.

339. The third right lower true molar; from "Big-Bone-Lick." The talon is small. *Purchased.*

340. The third left lower true molar; from "Big-Bone-Lick." The talon is double, and of large size. *Purchased.*

341. The third left lower true molar; from "Big-Bone-Lick."
Purchased.

40783. The third left lower true molar, with the first ridge imperfect; from the Pleistocene of Savannah, Georgia, U.S.A.
Presented by C. Falconer, Esq., 1867.

40933 a. Cast of the third right lower true molar, with the first ridge imperfect. The original is from Ohio, and is preserved in the Museum of Natural History at Lyons; it is figured by Lortet and Chantre in the Arch. Mus. Lyon, vol. ii. pl. x. fig. 2 (1878).
Presented by C. Falconer, Esq., 1867.

7435. The almost unworn third right lower true molar, bisected in a longitudinal and horizontal plane at the base of the crown; from "Big-Bone-Lick."
Mantell Collection. Purchased, 1836.

17323. The unworn third left lower true molar, with the inner side cut and polished; from Missouri.
Purchased. *About* 1844.

17284. The right scapula; from Missouri.
Purchased. *About* 1844.

17285. Part of the right scapula; from Missouri.
Purchased. *About* 1844.

17189. The glenoidal half of the right scapula; from Missouri.
Purchased. *About* 1844.

17286. The greater part of the left scapula; from Missouri.
Purchased. *About* 1844.

344. The glenoidal part of the right scapula; from "Big-Bone-Lick." *Purchased.*

17164, 17271, 17273. Three specimens of the right humerus; from Missouri. *Purchased.* *About* 1844.

17268. The left humerus; from Missouri. *Purchased.* *About* 1844.

17162, 17278, 17429. Three specimens of the ulna; from Missouri.
Purchased. *About* 1844.

17211. The left cuneiform; from Missouri. *Purchased.* *About* 1844.

17193. The left unciform, of large size; from Missouri.
Purchased. *About* 1844.

17258. The left unciform of a much smaller individual; from Missouri. *Purchased.* *About* 1844.

17405–7. Three specimens of the innominate; from Missouri.
Purchased. *About* 1844.

17165, 17166, 17174. Three specimens of the femur; from Missouri.
Purchased. *About* 1844.

17149, 17163. Two specimens of the tibia; from Missouri.
Purchased. *About* 1844.

17195, 17237. Two specimens of the astragalus; from Missouri.
Purchased. *About* 1844.

17210. The right navicular; from Missouri.
Purchased. *About* 1844.

17207, 17245. Two specimens of the atlas vertebra; from Missouri.
Purchased. *About* 1844.

17198. The axis vertebra; from Missouri. *Purchased. About* 1844.

17881. A dorsal vertebra; from Missouri. *Purchased. About* 1844.

17884. A dorsal vertebra; from Missouri. *Purchased. About* 1844.

17205, 17248. The neural spines of two early dorsal vertebræ; from Missouri. *Purchased. About* 1844.

17206. A lumbar vertebra; from Missouri. *Purchased. About* 1844.

41661. A lumbar vertebra; from "Big-Bone-Lick." *Toulmin-Smith Collection. Purchased,* 1869.

Mastodon borsoni, Hays[1].

Syn. *Mastodon buffonis,* Pomel[2].
Mastodon virgatidens, Meyer[3].

The mandibular symphysis is comparatively short, and is frequently furnished with a pair of small incisors (see Lortet and Chantre, Arch. Mus. Lyon, vol. ii. pl. xvi. fig. 1 [1878]), but in other specimens appears edentulous (*ibid.* pl. xii. fig. 3); the ridges and valleys of the molars run straight across the crown, the bases of the valleys being partially blocked, and one half of each ridge wearing into a more or less complete trefoil. The cingulum is continuous with the talons. The molars present a great resemblance to those of *M. americanus* and *M. turicensis*, but are distinguished from those of the latter by their generally superior size, greater breadth, lower ridges[4], general flatness, and the smaller cingulum on the inner side of those of the upper jaw. It is probable that the species is a more specialized branch of the stock of *M. turicensis.*

Hab. Europe. The species was originally described from the Lower Pliocene (Astien) of Asti in Piedmont, and has been subsequently recorded by Vacek (Abh. k.-k. geol. Reichs. vol. vii. pt. 4, pp. 6–11 [1877]) from the Lower Pliocene (Congerian) of Austria-Hungary, by Lortet and Chantre (Arch. Mus. Lyon, vol. ii. p. 306 [1878]) from the Upper Pliocene of the south of France, and by Forsyth-Major (Quart. Journ. Geol. Soc. vol. xli. p. 2 [1885]) from the

[1] Trans. Amer. Phil. Soc. ser. 2, vol. iv. p. 334 (1834).

[2] Bull. Soc. Géol. France, sér. 2, vol. v. p. 258 (1848).

[3] 'Palæontographica,' vol. xvii. p. 61 (1867). See Vacek, Abh. k.-k. geol. Reichs. vol. vii. pt. 4, p. 7 (1877).

[4] Lankester, in describing teeth from the Red Crag, Quart. Journ. Geol. Soc. vol. xxvi. p. 509 (1870), reverses these characters.

Upper Pliocene of the Val d'Arno. Vacek (*op. cit.* pp. 7, 11) suggests that the specimens from Pikermi, described by Gaudry under the name of *M. turicensis*, more probably belong to the present species, which he records from the contemporaneous strata of Baltavar, in Hungary. It occurs in the Red Crag of England[1].

46690. A fourth right upper milk-molar provisionally referred to this species; from the Red Crag of Woodbridge, Suffolk. The ridges are much worn and rolled. *Purchased*, 1875.

42727. A partially-worn and much-rolled second left upper true molar, containing three ridges; from the Red Crag of Sutton, Suffolk. If complete, this tooth may probably be referred to the present species, and would appear to agree with an example figured by Vacek in the Abh. k.-k. geol. Reichs. vol. vii. pt. 4, pl. vi. fig. 3; if, however, it has lost one ridge, it should be referred to *M. longirostris*.
Purchased, 1871.

M. 2845. Cast of the second left upper true molar. The original is from the Upper Pliocene of the south of France; and the specimen closely resembles a molar figured by Lortet and Chantre in the Arch. Mus. Lyon, vol. ii. pl. xi. fig. 1 (1878). *Bravard Collection. Purchased*, 1852.

M. 2847. Cast of the third left upper true molar. The original is from the Upper Pliocene of St. Yvoine, near Issoire (Puy-de-Dôme), France, and is preserved in the Museum of Natural History at Lyons; it is figured by Lortet and Chantre, *op. cit.* pl. xi. fig. 2.
Bravard Collection. Purchased, 1852.

M. 2846. Cast of the second left lower true molar. The original is from the Upper Pliocene of the south of France. The specimen closely resembles an homologous tooth figured by Lortet and Chantre, *op. cit.* pl. xi. fig. 5[2].
Bravard Collection. Purchased, 1852.

M. 2848. Cast of the third left lower true molar. The original is from the Upper Pliocene of Vialette[3] (Haute-Loire),

[1] See a paper by the writer on Crag Vertebrata, in the Quart. Journ. Geol. Soc. vol. xlii. p. 365 (1886).

[2] Given in the description of the plate as fig. 4.

[3] Messrs. Lortet and Chantre, *op. cit.* p. 307, assign the beds at Vialette and the other places in the south of France, where *M. borsoni* occurs, to the Lower Pliocene; but the writer follows Gaudry ('Les Enchaînements, &c.—Mammifères Tertiaires,' p. 6) in classing them with the Upper Pliocene.

France, and is preserved in the Museum of Natural History at Lyons; it is figured by Lortet and Chantre, *op. cit.* pl. xi. fig. 4[1].

The following specimens may perhaps belong to the present species.

42089. Fragment of an upper (?) true molar; from a gravel-pit at Swaffham, Norfolk. This specimen is noticed by Lankester in the Quart. Journ. Geol. Soc. vol. xxvi. p. 509 (1870). *Presented by C. B. Rose, Esq.*, 1871.

42720. The last two ridges and talon of a third lower true molar; from the Red Crag of Sutton, Suffolk. *Purchased*, 1871.

Mastodon turicensis, Schinz[2].

Syn. *Mastodon tapiroides*, auct.
Tetrabelodon turicensis, Cope[3].

Since there is a great probability that the name *Mastodon tapiroides*, Cuvier[4], was applied to milk-molars of *M. angustidens*[5], Schinz's name is adopted for the present species.

According to Lartet[6] the upper incisors are furnished with an enamel-band, while the mandibular symphysis is elongated and carries a pair of incisors[7]. The ridges and valleys of the cheek-teeth extend straight across the crown, accessory tubercles being absent, and one column of each ridge wearing into an imperfect trefoil; their crowns are relatively narrow, and the ridges tall and inclined; a strong cingulum exists in the upper molars, and those of both jaws have small, multicuspidate talons. The "intermediate" molars very closely resemble those of *M. americanus*; while the milk-molars are almost indistinguishable from those of *M. angustidens*. Premolars were developed[8].

Hab. Europe (France, Germany, Austria-Hungary, and Russia).

33589. The first left upper true molar; from the Middle Miocene of St. Gaudens (Haute-Garonne), France. This specimen agrees very closely with the tooth figured by Lortet and Chantre in the Arch. Mus. Lyon, vol. ii. pl. viii. fig. 3 (1878). *Purchased*, 1858.

[1] Given in the description of the plate as fig. 5.
[2] Denkschr. schw. Ges. Nat. vol. i. pt. 2, p. 59 (1833).
[3] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).
[4] Ossemens Fossiles, 2nd ed. vol. i. p. 268 (1821).
[5] See Lortet and Chantre, Arch. Mus. Lyon, vol. ii. p. 308 (1878).
[6] Notice sur la Colline de Sansan, p. 27 (1851).
[7] See 'Falconer's Palæontological Memoirs,' vol. ii. pp. 67, 68 (1868).
[8] See Lortet and Chantre, *op. cit.* pl. ix. fig. 8.

33590. The associated second right upper true molar and the third true molar of both sides; from St. Gaudens. The last tooth has a well-developed cingulum, and carries four ridges and a hind talon. *Purchased*, 1858.

33588. The third left upper true molar, in an almost unworn condition; from St. Gaudens. The specimen has only three ridges and a hind talon. *Purchased*, 1858.

33592. Two upper incisors; from St. Gaudens. These specimens show a broad enamel-band. *Purchased*, 1858.

40918. Cast of the first left lower true molar. The original is from the Middle Miocene of Soblay (Ain), France, and is preserved in the Museum of Natural History at Lyons; it is figured by Lortet and Chantre, *op. cit.* pl. ix. fig. 6. *Presented by C. Falconer, Esq.*, 1867.

40933. Cast of the germ of the second right lower true molar. The original is from Soblay, and is preserved in the Museum of Natural History at Lyons; it is figured by Lortet and Chantre, *op. cit.* pl. ix. fig. 3. A very similar specimen from Croatia is figured by Vacek in the Abh. k.-k. geol. Reichs. vol. vii. pt. 4, pl. vii. fig. 4 (1877). *Presented by C. Falconer, Esq.*, 1867.

33587. The third right lower true molar, probably belonging to the same individual as No. 33588; from the Middle Miocene of St. Gaudens. There are three ridges and a talon. *Purchased*, 1858.

Mastodon angustidens, Cuvier[1].

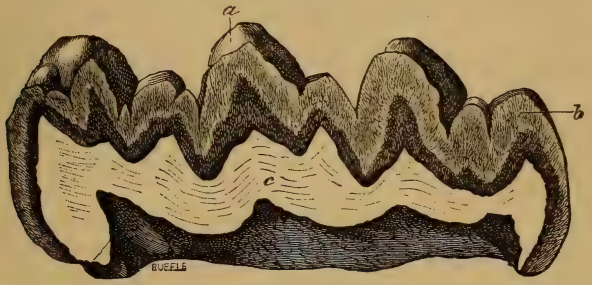
Syn. *Mastodon cuvieri*, Pomel[2].
Mastodon simorrensis, Lartet[3].
Mastodon gaujaci, Lartet[4].
Mastodon pyrenaicus, Falconer[5] (*ex* Lartet, MS.).
Tetrabelodon angustidens, Cope[6].

According to Falconer[7] the so-called *M. gaujaci* was founded on a small form of the present species; while Gaudry[8] states that

[1] Ann. d. Muséum, vol. viii. p. 412 (1806).—*Mastodonte à dents étroites.*
[2] Bull. Soc. Géol. France, sér. 2, vol. v. p. 258 (1848).
[3] Notice sur la Colline de Sansan, p. 24 (1851).
[4] *Ibid.* p. 27.
[5] Quart. Journ. Geol. Soc. vol. xiii., table opposite p. 319 (1857).
[6] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).
[7] Palæontological Memoirs, vol. ii. p. 24 (1868).
[8] Les Enchaînements, &c.—Mammifères Tertiaires, p. 175 (1878).

M. pyrenaicus is a variety in which the accessory columns of the molars are less developed, thereby indicating a transition towards *M. turicensis*. This is the smallest and one of the most generalized species. The upper incisors are furnished with an enamel-band; the mandibular symphysis is longer than in any other species, is somewhat deflected, and carries large incisors, which have a pyriform basal section: the mandibular rami are laterally compressed. The cheek-teeth are characterized by their extreme narrowness; their ridges are divided into inner and outer columns, which have a tendency to an alternate arrangement, and the valleys are always blocked by accessory columns, the development of which varies considerably in different individuals. The inferior border of the mandibular ramus is nearly straight, and the incisive alveoli are parallel. One column of each of the earlier ridges wears into a more or less complete trefoil: the "intermediate" lower molars have a small anterior and a large posterior talon, the latter usually having two distinct columns; there is a certain amount of variation in the form of the third true molar. A section of $\overline{\text{m. 1}}$ is shown in the accompanying woodcut (fig. 4).

Fig. 4.



Mastodon angustidens.—Vertical longitudinal section of the first lower true molar; from the Middle Miocene of Simorre. ⅔. *b*, enamel; *c*, dentine.

Hab. Europe, N.W. frontier of India, and (?) North America. In Europe[1] the species occurs in France, Switzerland, Bavaria, Bohemia, Austria-Hungary, and Styria. In Eastern Europe it occurs in the Middle Miocene, in Western Europe in the Sarmatian stage of the same, and in Asia in the Upper Miocene or Lower Pliocene. The Asiatic form[2], which has been distinguished as var. *palæindicus*, presents a somewhat greater development of the accessory columns;

[1] See Vacek, Abh. k.-k. geol. Reichs. vol. vii. pt. 4, pp. 23–25 (1877).

[2] Palæontologia Indica (Mem. Geol. Surv. Ind.), ser. 10, vol. iii. pp. 19–29, pls. iv., v. (1884).

but this can scarcely be regarded as a specific character. Cope[1] has recorded the species from North America, but it is not very apparent how this form differs from the closely allied *M. obscurus*, Leidy[2], which it has been thought may be only a local race of the European species[3].

37243. The cranium, in a much crushed condition, and wanting the greater portion of the incisors; from the Middle Miocene of Sansan (Gers), France. On the right side the three true molars, and on the left m. 2 and m. 3 are in position; m. 3 is but slightly worn. *Purchased*, 1857.

37242. Two upper incisors; from Sansan. The following specimens with the same number belong to the same individual. *Purchased*, 1857.

M. 2896. An upper incisor; from Sansan. *Purchased.*

M. 2895. An imperfect upper incisor; from Sansan. *Purchased.*

40733. The terminal half of an upper incisor; from Sansan. *Presented by C. Falconer, Esq.*, 1867.

40738. The third upper premolar; from Sansan. *Presented by C. Falconer, Esq.*, 1867.

29674. The third right upper milk-molar; from the Middle Miocene of Simorre (Gers). *Presented by M. E. Lartet*, 1855.

40737. The much-worn third right upper milk-molar; from Sansan. *Presented by C. Falconer, Esq.*, 1867.

40742 a. The germ of the fourth right upper milk-molar; from Simorre. *Presented by C. Falconer, Esq.*, 1867.

40736. The fourth left upper milk-molar, in a very early stage of wear; from Sansan. *Presented by C. Falconer, Esq.*, 1867.

29638. Cast of the third left upper milk-molar, in a half-worn condition. The original is from Sansan. *Hastings Collection. Purchased*, 1855.

[1] Amer. Nat. vol. xviii. p. 524 (1884).

[2] See 'Extinct Vertebrate Fauna of the Western Territories' (Rep. U. S. Geol. Surv.), pl. xxii. figs. 1–4 (1873). The tooth figured in plate xxi. figs. 1 and 2 of the same work has been regarded by Cope (Proc. Amer. Phil. Soc. vol. xxii. p. 5 [1884]) as distinct, and is renamed *Mastodon* (*Dibelodon*) *shepardi*, Leidy.

[3] See 'Palæontologia Indica,' *op. cit.* pp. 28, 29.

40734. Fragment showing the hinder part of the left mm. 4, the unworn m. 1, and pm. 4 *in alveolo*; from Sansan.
Presented by C. Falconer, Esq., 1867.

29635. Cast of the first left upper true molar, in a half-worn condition. The original is from Sansan.
Hastings Collection. Purchased, 1855.

40742. A much-worn first right upper true molar; from Sansan.
Presented by C. Falconer, Esq., 1867.

29634. Cast of the second left upper true molar, in a well-worn condition. The original is from Sansan, and is figured in Kaup's 'Beiträge,' pt. 3, pl. iii.[1], and in 'Falconer's Palæontological Memoirs,' vol. ii. pl. iii. figs. 3, 4.
Hastings Collection. Purchased, 1855.

40730. The associated second and third right upper true molars; from Sansan. The third molar has four ridges.
Presented by C. Falconer, Esq., 1867.

37242. The associated second and third upper true molars of both sides; from Sansan. *Purchased*, 1857.

36757. Cast of a fragment of the left maxilla containing the associated second and third upper true molars. The original is from Sansan, and is figured in Kaup's 'Beiträge,' pt. 3, pl. v. fig. 2. The third molar has four ridges and a talon.
Purchased, 1858.

37242 b. The third right upper true molar, showing four ridges and a rudimentary talon; from Sansan. *Purchased*, 1857.

32533. The imperfect third right upper true molar; from Sansan.
Tesson Collection. Purchased, 1857.

32534. The unworn third right upper true molar, showing four ridges and a talon; from Sansan.
Tesson Collection. Purchased, 1857.

7424. Cast of the third left upper true molar. The original is from the Middle Miocene of Chevilly, near Orleans (Loiret), France. *Mantell Collection. Purchased*, 1836.

M. 2897. Cast of the third right upper true molar. The original, of which the locality is unknown, is almost untouched by wear. *Purchased*, 1838.

[1] The second figure from the right in the first and second rows.

37243 a. The mandible, showing the incisors, the three true molars on the right, and $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$ on the left side; from Sansan. This specimen belongs to the same individual as the cranium No. 37243. *Purchased*, 1857.

37242 c. Fragment of the right ramus of the mandible, containing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Sansan. *Purchased*, 1857.

37242 d. Fragment of the left ramus of the mandible, containing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Sansan. The third molar carries four ridges and a single hind talon. *Purchased*, 1857.

36754. Cast of the mandible, showing the right incisor and $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$ of both sides. The original is from Sansan, and is figured in Kaup's 'Beiträge,' pt. 3, pl. vi. figs. 1, 2, 3. *Purchased*, 1858.

36755. Cast of the mandible of a young individual, showing $\overline{\text{pm. 3}}$, $\overline{\text{pm. 4}}$ *in alveolo*. The original is from Sansan, and is figured in Kaup's 'Beiträge,' pt. 3, pl. i. The specimen indicates a small individual, equal in size to No. 29637, and much smaller than the preceding specimen. *Purchased*, 1858.

40729. Two fragments of the opposite sides of the mandible, each showing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from Sansan. *Presented by C. Falconer, Esq.*, 1867.

29637. Cast of a fragment of the left ramus of the mandible, showing the three milk-molars, which are of very small size. The original is from Sansan. *Hastings Collection. Purchased*, 1855.

40763. The third right lower milk-molar; from Sansan. This specimen agrees very closely with $\overline{\text{mm. 3}}$ of No. 29637. *Presented by C. Falconer, Esq.*, 1867.

M. 2894. Cast of the third left lower milk-molar of a larger individual. The original is from Sansan. *No history.*

40740. A tooth, provisionally regarded as a large specimen of the third left lower milk-molar (so determined from having fore-and-aft disks of pressure); from Sansan. *Presented by C. Falconer, Esq.*, 1867.

M. 2409. Four specimens of the third lower premolar; from Sansan. *Purchased*, 1885.

29675. The germ of the fourth right lower premolar; from Simorre. *Presented by M. E. Lartet*, 1855.

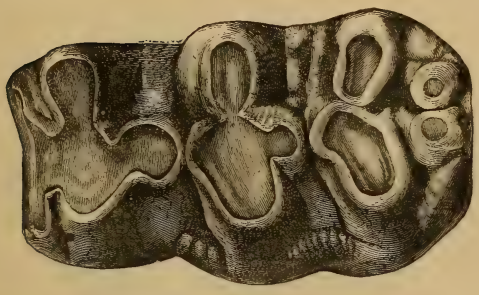
29639. Cast of a tooth provisionally regarded as the fourth left lower premolar (so determined from the absence of any anterior disk of pressure).

Hastings Collection. *Purchased*, 1855.

40739. The fourth left lower premolar, in an early stage of wear; from Sansan. This specimen agrees almost exactly with the more worn Indian example of the homologous tooth figured in the accompanying woodcut (fig. 5).

Presented by C. Falconer, Esq., 1867.

Fig. 5.



Mastodon angustidens, var. *palæindicus*.—The fourth left lower milk-molar; from the Lower Siwaliks of Dera Búgti, north-west frontier of India. ¼. Indian Museum, Calcutta, No. A 422.

29671. The unworn first right lower true molar; from Simorre. This tooth agrees precisely with $\overline{\text{m. 1}}$ of No. 36755, and is therefore regarded as homologous; but it is not certain that (together with the next two specimens) it may not be $\overline{\text{mm. 4}}$ of a larger individual.

Presented by M. E. Lartet, 1855.

40741. An imperfect specimen of a similar tooth, in a partially worn condition; from Sansan.

Presented by C. Falconer, Esq., 1867.

7426. Cast of the first left lower true molar. The original, which is in a half-worn condition, is from the Middle Miocene of Saxony. *Mantell Collection.* *Purchased*, 1836.

29636. Cast of the first left lower true molar. The original, which is in a half-worn condition, and is of a wider type than either of the preceding specimens, was obtained from Sansan. *Hastings Collection.* *Purchased*, 1855.

M. 2893. (*Fig.*) The unworn first right lower true molar, wanting the hind talon; locality unknown. This specimen is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xl. fig. 7, where it is described as the last milk-molar of the upper jaw.

Presented by E. Charlesworth, Esq.

40788. (*Fig.*) The first two ridges of the first right lower true molar; from the north of Sind or the regions across the north-west frontier of India[1]. This specimen (woodcut, fig. 6)

Fig. 6.

Mastodon angustidens, var. *palæindicus*.—The first and second ridges of the first right lower true molar, in a half-worn condition; from the Lower Siwaliks of Sind or the regions to the north or west. ½. (From the 'Palæontologia Indica.')

has been described and figured in the 'Palæontologia Indica,' ser. 10, vol. iii. p. 32, woodcut fig. 6, as (?) mm. 3 of *M. falconeri*, but was subsequently shown (*ibid.* p. xix) to belong to the present species; it agrees almost precisely with the imperfect tooth of the opposite side figured in pl. iv. fig. 8 of the same volume. Like that tooth it indicates a smaller individual than the European specimens of m. 2 (Nos. 7425, 42720).

Presented by C. Falconer, Esq., 1867.

32503. The second and third ridges and hind talon of the first right lower true molar, agreeing in size with the preceding specimen, but in a rather less worn condition; from the

[1] See 'Palæontologia Indica,' ser. 10, vol. iii. pp. 1, 29.

same locality. This specimen is noticed in the 'Palæontologia Indica' in the passages cited.

Presented by Col. Sykes. About 1856.

7425. Cast of the second right lower true molar. The original, which is in a half-worn condition, was obtained from Simorre, and is described and figured in Cuvier's 'Ossemens Fossiles,' 2nd ed. vol. i. p. 255, "Divers Mastodontes," pl. i. fig. 4 (reversed); it is also figured in the 'Fauna Antiqua Sivalensis,' pl. xl. figs. 9, 9 *a* (as an upper tooth), and in Kaup's 'Beiträge,' pt. 3, pl. iii.[1]

Mantell Collection. Purchased, 1836.

42720. The second left lower true molar, in an early stage of wear; from Simorre. This specimen agrees precisely with the preceding.

Presented by the Trustees of the Christie Museum, 1871.

M. 2900. An almost identical specimen of the opposite side, in a still earlier state of wear; locality unknown. *No history.*

M. 2898. Cast of the much-worn second left lower true molar. The original, of which the locality is doubtful, is figured by Kaup in the 'Oss. Foss. d. Darmstadt,' pt. 4, pl. xx. fig. 4 (as *M. longirostris*), and in the 'Beiträge,' pt. 3, pl. ii. fig. 4 (as *M. arvernensis*). *Purchased.*

40735. The imperfect third right lower true molar, in a much-worn condition; from Sansan. This specimen shows four ridges and a single talon, and agrees very closely with the Indian example figured by the writer in the 'Palæontologia Indica,' ser. 10, vol. iii. pl. iv. fig. 3.

Presented by C. Falconer, Esq., 1867.

M. 2899. Cast of the third right lower true molar, in an early stage of wear. The locality of the original is unknown. The crown is very narrow, the valleys comparatively open, and there are four ridges and a double hind talon.

Purchased, 1838.

32532. The hinder portion of the third left lower true molar; from the Middle Miocene of Touraine, France.

Tesson Collection. Purchased, 1857.

40780. The last three ridges and talon of an almost unworn third left lower true molar, provisionally referred to this species;

[1] The second figure from the right in the second and third rows.

probably from the Lower Siwaliks of Northern Sind or the regions across the north-west frontier of India[1]. The specimen is rather wider than the Indian specimen figured by the writer in the 'Palæontologia Indica,' ser. 10, vol. iii. pl. iv. fig. 3, but agrees very closely with the homologous tooth of the mandible No. 37243 *a*.

Presented by C. Falconer, Esq., 1867.

40781. Two specimens of the hinder portion of the third right lower true molar, agreeing with the preceding; from the same locality. *Presented by C. Falconer, Esq.*, 1867.

40731. Two imperfect lower incisors; from Sansan.

Presented by C. Falconer, Esq., 1867.

30537. The two imperfect lower incisors of an immature individual; from Sansan. *Purchased. About* 1856.

37242. The greater part of the two lower incisors of a somewhat larger individual; from Sansan. *Purchased*, 1855.

33592 a. The left cuneiform; from the Middle Miocene of Ville-Franche d'Astarac (Gers). *Purchased.*

33592 b. The left unciform; from Ville-Franche d'Astarac.

Purchased.

33592 c. The left astragalus; from Ville-Franche d'Astarac.

Purchased.

33592 d. The left calcaneum; from Ville-Franche d'Astarac.

Purchased.

33592 e. The left navicular; from Ville-Franche d'Astarac.

Purchased.

48451. Anterior portion of the right ramus of the mandible of a young *Mastodon*, which may belong to the present species; probably from the Lower Siwaliks of Sind or the regions to the North-west. This specimen shows the alveoli of the three milk-molars; it is noticed in the writer's 'Cat. Siwalik Vert. Ind. Mus.,' pt. i. p. 101 (No. A 354), where it is provisionally referred to *M. pandionis*.

Presented by C. Falconer, Esq., 1867.

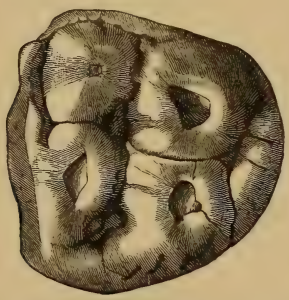
[1] See 'Palæontologia Indica,' ser. 10, vol. iii. pp. 1, 29.

Mastodon pandionis, Falconer[1].

Syn. *Tetrabelodon pandionis,* Cope[2].

In this species the mandibular symphysis is produced into a long, deeply hollowed, trough-like expansion, which in some specimens is edentulous, but in others (which are apparently specifically identical) is furnished with a pair of large laterally compressed incisors[3], the mandibular rami being also compressed in the same direction. The cheek-teeth are relatively wide, and are normally characterized by the extreme complexity of the structure of the crowns, the accessory tubercles being very numerous, placed on both sides of the median longitudinal cleft, and completely blocking the valleys, although in some earlier "intermediate" molars provisionally referred to this species[4] the valleys are more free. The ridges are divided into inner and outer columns, which have an alternate arrangement, and when worn do not present distinct trefoils of dentine. The third milk-molars provisionally referred to it are more complex than is usually the case with trilophodont species, and in this respect agree with those of *M. pentelici*; the third upper true molar is relatively

Fig. 7.



? *Mastodon pandionis.*—The fourth right upper premolar; from the Lower Siwaliks of Dera Búgti, north-west frontier of India. ½. Indian Museum, Calcutta, No. A 432. (From the 'Palæontologia Indica.')

short; and the enamel of all the teeth is thrown into vertical plications. It is probable that premolars were developed, at least in some instances[5], and a tooth provisionally so considered is figured in the accompanying woodcut (fig. 7).

[1] Palæontological Memoirs, vol. i. p. 124 (1868).

[2] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).

[3] See 'Palæontologia Indica' (Mem. Geol. Surv. Ind.), ser. 10, vol. i. pl. xxxv. and Cat. Siwalik Vert. Ind. Mus. Calcutta, pt. i. pp. 99–101 [1885]).

[4] 'Palæontologia Indica,' ser. 10, vol. iii. p. xx (1888). [5] *Loc. cit.*

Hab. India (Perim Island, Sind, Punjab, and North-west Frontier), and (?) China[1].

40818. (*Fig.*) The first left upper true molar; from the Lower Siwaliks of Sind, India, or the regions to the north[2]. This specimen, which is almost unworn, is figured in 'Falconer's Palæontological Memoirs,' vol. i. pl. xxxiv. figs. 6, 7, and in the 'Palæontologia Indica,' ser. 10, vol. iii. pl. v. fig. 5, and is the type of the species. It differs from mm. 4 of *M. pentelici* by its taller and more nearly vertical ridges and by the greater blocking of the valleys, in consequence of which the crown surface of the first two inner columns forms a distinct W. *Presented by C. Falconer, Esq.*, 1867.

M. 2491. (*Fig.*) A tooth regarded as a somewhat abnormal example of the first left upper true molar; from the Siwaliks of Perim Island, Gulf of Cambay, India. Described and figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. iii. p. 149, pl. xvii. figs. 2, 2 *a*.
Presented by Diwán Wajeshankar Gowreeshankar, 1885.

M. 494. Part of the palate, showing the broken base of m. 1, and m. 2 *in alveolo*; from Perim Island.
Transferred from the Old Indian Museum, 1880.

M. 2490. (*Fig.*) The third left upper true molar, in a well-worn condition, and wanting part of the fourth ridge and the talon; from Perim Island. Figured by the writer in the 'Palæontologia Indica,' ser. 10, vol. iii. pl. xvi. fig. 1; a perfect unworn specimen is figured in plate xxxv A. of the first volume of the same series.
Presented by Diwán Wajeshankar Gowreeshankar, 1885.

40787. A tooth provisionally regarded as the fourth left lower premolar of this species; probably from Sind. This specimen is noticed in the 'Palæontologia Indica,' ser. 10, vol. i. p. 221, a very similar specimen being figured in pl. xxxv. fig. 2 of that volume; it has no anterior disk of pressure. *Presented by C. Falconer, Esq.*, 1867.

40779. (*Fig.*) A third left lower milk-molar provisionally referred to this species; from Perim Island. This specimen (woodcut, fig. 8) has been described and figured by the present writer (*op. cit.* vol. iii. p. xx, woodcut); it has the plicated

[1] Koken, Pal. Abhand. vol. iii. pt. 2, p. 9 (1885).
[2] See 'Palæontologia Indica,' ser. 10, vol. iii. p. 29.

enamel characteristic of the species, and agrees with the corresponding tooth of a young cranium, of which three teeth are figured in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xxxii. figs. 2, 3, and pl. xxxiii. fig. 2[1].

Presented by C. Falconer, Esq., 1867.

Fig. 8.

(?) *Mastodon pandionis.*—The third left lower milk-molar; from Perim Island. Viewed from the grinding and outer lateral aspects. ½. (From the 'Palæontologia Indica.')

M. 3436. The imperfect hinder half of a third lower true molar; from Perim Island. This specimen agrees with the complete tooth figured by the present writer, *op. cit.* vol. i. pl. xxxiv. fig. 2. *Presented by Col. J. W. Watson*, 1886.

M. 295. Part of the right ramus of the mandible, with the much-worn $\overline{\text{m. 3}}$; from Perim Island.

Transferred from the Old Indian Museum, 1880.

The two following specimens (of which the precise locality is unknown) if obtained from Perim Island might belong to the present species; they certainly do not belong to M. sivalensis.

M. 2884. Part of the mandibular symphysis of a very young individual, showing a deeply hollowed median groove, on either side of which is a small, laterally-compressed, incisor; from the Siwaliks of India. The specimen presents a strong resemblance to the adult symphysis of *M. pandionis*, figured in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xxxvi. fig. 1. *No history.*

M. 2096. A very similar specimen to the preceding, showing the incisive alveoli; from the Siwaliks of India. Entered on page 274 of Part II. as belonging to a suilline artiodactyle. *Cautley Collection. Presented*, 1842.

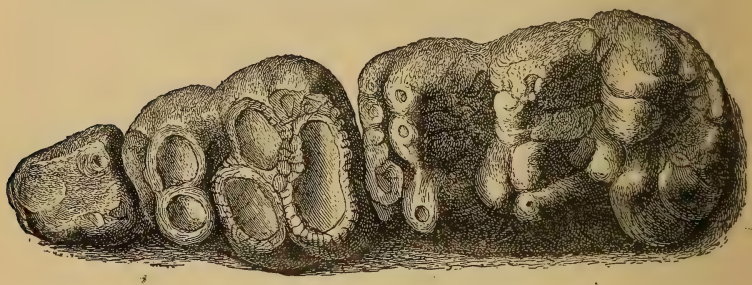
[1] Originally figured as *M. falconeri*, but provisionally referred to the present species in vol. iii. p. xx of the same work.

Mastodon pentelici, Gaudry and Lartet[1].

Syn. *Tetrabelodon pentelici,* Cope[2].

This species is at present unrepresented in the Museum Collection, although it is important that it should be noticed here; at present it appears to be only known by immature specimens. In mm. 4 the ridges are interrupted and the valleys partially blocked by accessory tubercles; the hind talon of mm. 3 is so largely developed as practically to form a third ridge (woodcut, fig. 9). The mandibular symphysis is produced to a considerable extent, and is furnished with incisors; but premolars do not appear to have been developed. The ridges of the milk-molars appear to be lower than in *M. pandionis.*

Fig. 9.



Mastodon pentelici.—The left upper milk-molars; from the Lower Pliocene of Pikermi. ½. (After Gaudry's 'Enchaînements.')

Hab. Greece, Hungary[3], and North-west Persia[4] (Lower Pliocene).

Mastodon falconeri, Lydekker[5].

This species is of very large size, and apparently has a short and incisor-less mandibular symphysis; the cheek-teeth present trefoils on one column of each ridge and resemble in general structure those of *M. angustidens*, although they are much larger and relatively wider. The species may be a more specialized descendant from the

[1] Comptes Rendus, vol. xliii. p. 273 (1856).—*M. pentelicus.*
[2] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).
[3] See Pethö, Jahresb. k. ung. geol. Anstalt, 1884, p. 63.
[4] See Lydekker, Quart. Journ. Geol. Soc. vol. xlii. p. 173 (1886).
[5] Rec. Geol. Surv. Ind. vol. x. p. 83 (1877).

M. angustidens stock. It is not known whether premolars were developed [1].

Hab. India (Punjab and Sind).

M. 2883. The first two ridges of the second left lower true molar, in an unworn condition ; from the Deraját, Punjab, India. This specimen apparently agrees precisely with the corresponding portion of the right $\overline{\text{m. 2}}$ figured in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xxxiii. fig. 4. In addition to its superior size and greater relative width, it differs from $\overline{\text{m. 2}}$ of *M. angustidens* by the form of the anterior cingulum, by the absence of a distinct accessory tubercle on the anterior side of the first inner column, by the presence of a greater number of tubercles on the ridges, by the form and size of the accessory tubercles in the valleys, and the more decided approach to an alternate arrangement of the columns. It is not improbable that the specimen belongs to the same individual as an upper true molar in the Indian Museum, Calcutta (No. A 327)[2].

Presented by Prof. Sir R. Owen, K.C.B., 1877.

Mastodon humboldti, Cuvier [3].

Syn. *Dibelodon humboldti*, Cope [4].

In the molars both the inner and outer columns (which are quite separate) of each ridge are flanked by accessory tubercles, so that the valleys are blocked on both sides of the median longitudinal cleft; and the enamel on the ridges being vertically grooved, a very complex pattern is produced on the worn ridges, there being trefoils on both the inner and outer columns of each ridge, although those on the inner columns of the upper and the outer of the lower are the best defined ; the columns of the ridges have a tendency to an alternate arrangement, and the median longitudinal cleft is well marked. The valleys of the teeth are coated with a thick coat of cement, and the mandibular symphysis is comparatively short and without incisors in the adult, although these appear to have been present in the young (No. 19952 *c*). Premolars have apparently not been observed.

[1] The specimens figured in the 'Palæontologia Indica' (Mem. Geol. Surv. Ind.), ser. 10, vol. i. pl. xxxii. figs. 2, 3, under this name probably belong to *M. pandionis*; *vide suprà*, p. 39.

[2] See Cat. Siwalik Vert. Ind. Mus. Calcutta, pt. i. p. 102 (1885).

[3] Ann. d. Muséum, vol. viii. p. 413 (1806).—*M. humboldien.*

[4] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).

Hab. South America (Colombia, Argentine Republic, Uruguay, and Brazil).

19951. (*Fig.*) The cranium and mandible of an adult male, with the vertex restored in plaster; from the Pleistocene of Buenos Ayres, Argentine Republic. The specimen shows the upper incisors, the short tuskless mandibular symphysis, and m. 2 and m. 3 of both jaws; m. 2 belongs, however, to another individual. The mandible is described and figured by Falconer in the 'Fauna Antiqua Sivalensis,' pl. xxxv. figs. 3, 3 *a*, and in the 'Palæontological Memoirs,' vol. i. p. 99, pl. viii. fig. 3 [1], under the name of *M. andium* [2].

Purchased, 1846.

M. 2950. (*Fig.*) Part of the palate, showing the broken m. 2 of both sides, and the left m. 3 in an early condition of wear; from the Pleistocene of South America. Described and figured by Camper in the Nov. Act. Petrop. vol. ii. p. 259, pl. viii. (1788). The double trefoils are very distinctly seen in m. 3, which is relatively short and carries four ridges and a double talon. *No history.*

39370. An imperfect cranium of a female *Mastodon*, probably belonging to the present species; from the Pleistocene of the Rio Negro, Uruguay. The incisive alveoli (of which the left one contains the base of the tusk) are of small size; m. 2 and m. 3 were in use, but their crowns have been broken off; the form of the base of m. 2 agrees almost exactly with No. 19952.

Presented by D. A. Stoddart, Esq., 1865.

19951 a. An incisor provisionally referred to this species; from South America. *Purchased*, 1846.

39372. The second left upper true molar, in a half-worn condition; from the Rio Negro.

Presented by D. A. Stoddart, Esq., 1865.

M. 2951. The second left upper true molar, in a slightly less worn condition; from South America.

Purchased. Before 1840.

19952. The second right upper true molar, in a rather more worn condition; from Buenos Ayres. *Purchased*, 1846.

[1] From vol. ii. p. 274 of this work it appears that Falconer subsequently discovered that this determination was erroneous.

[2] Described as being drawn of $\frac{1}{3}$ instead of $\frac{1}{4}$ nat. size.

19952 a. (*Fig.*) The second right upper true molar, in a very much worn condition; from Buenos Ayres. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xl. fig. 11, under the name of *M. andium*. *Purchased*, 1846.

19952 b. (*Fig.*) The associated right and left third upper true molars, in an early stage of wear; from Buenos Ayres. The specimen of the left side (woodcut, fig. 10) is figured by Falconer and Cautley, *op. cit.* pl. xl. fig. 12, as *M. andium*.

Fig. 10.

Mastodon humboldti.—The third left upper true molar; from the Pleistocene of Buenos Ayres. $\frac{2}{3}$. The lower border of the figure is the inner border of the specimen.

Each tooth carries four ridges and a double hind talon; when more worn the double trefoils would be produced; cement is present. It agrees very closely with the specimen figured by P. Gervais in the 'Mammifères Fossiles de l'Amérique méridionale,' pl. v. fig. 9 (1855).

Purchased, 1846.

6 (O. C.). (*Fig.*) The imperfect third right upper true molar, in a partially worn condition; from South America. Figured by Falconer and Cautley, *op. cit.* pl. xl. fig. 10, as *M. andium*. A large quantity of cement is present.

Presented by the Earl of Shelburne, 1768.

19952 c. (*Fig.*) Part of the left ramus of the mandible of a young individual, containing $\overline{\text{mm. 4}}$ and $\overline{\text{m 1}}$, the latter unworn; from Buenos Ayres. This specimen is figured by Falconer and Cautley, *op. cit.* pl. xl. fig. 13, and also in 'Falconer's Palæontological Memoirs,' vol. i. pl. viii. fig. 1 [1], as *M. andium*. The double trefoils are shown in the second ridge of $\overline{\text{mm. 4}}$; there is a cylindrical incisive alveolus.

Purchased. Before 1840.

39374. The germ of the second right lower true molar; from the Rio Negro. The hind talon is of moderate size.

Presented by D. A. Stoddart, Esq., 1865.

43254. The second left lower true molar, in a well-worn condition; from Buenos Ayres.

Presented by Señor L. J. Fontana, 1871.

19952 d. The second left lower true molar, in a more worn condition; from Buenos Ayres. The second and third ridges are more worn than the first. *Purchased*, 1846.

44135. The third right lower true molar, in a partially worn condition; probably from the Rio Negro. *Purchased*, 1873.

19952 e. (*Fig.*) The third right lower true molar, in a partially worn condition; from Buenos Ayres. Figured by Falconer and Cautley, *op. cit.* pl. xl. fig. 11, under the name of *M. andium*. There are four ridges and a double hind talon.

Purchased, 1846.

19952 f. Fragment of the left ramus of the mandible, containing the partially-worn $\overline{\text{m. 3}}$ (imperfect anteriorly); from Buenos Ayres. The hind talon is very large.

Purchased, 1846.

M. 2952. Fragment of the left ramus of the mandible, containing $\overline{\text{m. 3}}$, of which the talon is wanting; from South America.

No history.

M. 2953. Fragment of the right ramus of the mandible, with $\overline{\text{m. 3}}$, of which the talon is wanting; from South America.

No history.

[1] In the description of the plate the teeth are named the second and third milk-molars (=$\overline{\text{mm. 3}}$ and $\overline{\text{mm. 4}}$); but there seems no reason for this view, which introduces an abnormal ridge-formula.

M. 2954. Fragment of the right ramus of the mandible, with part of a much-worn molar; from South America.

No history.

39375. Fragment of an unworn right lower molar, provisionally referred to this species; from the Rio Negro.

Presented by D. A. Stoddart, Esq., 1865.

39373. Hinder part of the third left lower true molar, in a well-worn condition; from the Rio Negro.

Presented by D. A. Stoddart, Esq., 1865.

37782. Hinder part of the third right lower true molar, in an early stage of wear; from the Rio Negro.

Presented by W. G. Lettsom, Esq., 1863.

The following specimens are from Buenos Ayres, and, unless otherwise stated, were purchased in 1846.

19952 g. The proximal portion of the left ulna.

19952 h. The right innominate.

19952 i. Fragment of the left innominate.

44134. The left femur. *Presented by N. Wetherell, Esq.*, 1873.

19952 j. The shaft of the left femur.

19952 k. Seven dorsal vertebræ, of which the neural arches are more or less incomplete.

19952 l. The neural arch of a dorsal vertebra.

19952 m. Two lumbar vertebræ.

19952 n. Two ribs.

Mastodon cordillerum, Cuvier [1].

Syn. *Mastodon cordillerarum*, Desmarest [2].
Mastodon andium, Cuvier [3].
Mastodon australis, Owen [4].
Tetrabelodon andium, Cope [5].

The cheek-teeth present a great general resemblance to those of

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[1] Ann. d. Muséum, vol. viii. p. 413 (1806).—*Mastodonte des Cordilières.*

[2] Mammalogie, p. 385 (1822).

[3] Oss. Foss. 2nd. ed. vol. v. pt. 2, p. 527 (1824).

[4] Ann. & Mag. Nat. Hist. ser. 1, vol. xiv. p. 269 (1844). See 'Falconer's Palæontological Memoirs,' vol. ii. p. 271 (1868).

[5] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).

M. humboldti, but are distinguished in early stages of wear by the presence of trefoils on only one column of each ridge (inner in upper and outer in lower teeth), in consequence of the absence or small development of the accessory tubercles on one side of the median longitudinal cleft. The form of the dentine-disk on the columns which do not present trefoils is pear-shaped, with the apex directed towards the adjacent column. Cement is present in but small amount; and the mandibular symphysis is produced into a long deflected beak furnished with large incisors. Premolars have not been observed. In the second true molar the talon is so large as almost to form a fourth ridge.

Hab. South America (Chili, Bolivia, and Peru), Mexico [1], and Texas (No. 41652).

41652. The third right upper true molar in an early stage of wear; from the Pleistocene of Texas [2], U.S.A. This specimen clearly exhibits the absence of a trefoil on the outer column of the last ridge, and apparently agrees very closely with the more worn specimen figured by P. Gervais in the 'Mammifères Fossiles de l'Amérique méridionale,' pl. v. fig. 3 (1855).

Toulmin-Smith Collection. Purchased, 1869.

40988. (*Fig.*) Part of the left ramus of the mandible, containing $\overline{\text{m. 1}}$ and $\overline{\text{m. 2}}$; from the Pleistocene of Chili. This specimen is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xl. fig. 15, the figure being copied in 'Falconer's Palæontological Memoirs,' vol. i. pl. viii. fig. 2. Both teeth are somewhat imperfect, and $\overline{\text{m. 2}}$ is not protruded; the characteristic pear-shaped disks are exhibited on the inner columns of $\overline{\text{m. 1}}$; the hind talon of $\overline{\text{m. 3}}$ might be reckoned as a fourth ridge. The two teeth respectively agree with the homologous specimens of the opposite ramus figured by P. Gervais, *op. cit.* pl. v. figs. 4, 5.

Presented by the Trustees of the Canterbury Museum, 1868.

20700 a. Fragment of a left maxilla without teeth, perhaps belonging to this species; from Texas. *No history.*

[1] Cope, Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).

[2] The specimen does not agree with the description of the one tooth on which *M. serridens*, Cope (Amer. Nat. vol. xviii. p. 525 [1884]), from Texas, is founded.

B. *Tetralophodont Group.*

The number of the ridges is usually four in the "intermediate" and five in the last true molars; but there may be occasionally five in the former and six in the latter. The complete normal ridge-formula is Mm. $\frac{2-3-4}{2-3-4}$, M. $\frac{4-4-5}{4-4-5}$.

Mastodon sivalensis, Cautley [1].

The cranium (woodcut, fig. 11) of this specialized species is much vaulted, and the mandibular symphysis short and devoid of incisors. The inner and outer columns of the cheek-teeth are placed alternately (although there is some variation in this respect), and when worn present irregularly-shaped disks of dentine. In consequence of this arrangement the valleys are completely blocked, and a small amount of cement is present. In some examples of the "intermediate" molars there are five ridges, while there may be six in the last true molar; the enamel of the milk-molars is vertically grooved but in the true molars it may be either grooved or smooth; and premolars have not been observed. The cheek-teeth are very like those of *M. arvernensis*; but the number of accessory tubercles is frequently more numerous, and trefoils are never formed on the columns, while the number of ridges is sometimes greater. The two species are, however, closely allied.

Hab. India (Siwalik Hills and Punjab). Unless otherwise stated, the following specimens are from the Pliocene of the Siwalik Hills.

M. 2876. (*Fig.*) The imperfect cranium of a male, with the mandible in apposition. The third true molar is *in situ* in both jaws and is in a half-worn condition. The specimen (woodcut, fig. 11) is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxxiii. fig. 4.

Cautley Collection. Presented, 1842.

M. 2877. (*Fig.*) The imperfect cranium of a female, showing the half-worn $\frac{\text{m. 3}}{}$ of either side. Figured by Falconer and Cautley, *op. cit.* pls. xxxii. and xxxiii. figs. 1–3; the former figure is copied in 'Falconer's Palæontological Memoirs,' vol. i. pl. x. The molar appears to have six ridges.

Cautley Collection. Presented, 1842.

[1] Journ. As. Soc. Beng. vol. v. p. 294 (1836); as a variety of *M. angustidens.*

M. 2878. (*Fig.*) The upper portion of an immature cranium. Figured by Falconer and Cautley, *op. cit.* pl. xxxix. figs. 4–6.

Cautley Collection. Presented, 1842.

Fig. 11.

Mastodon sivalensis.—Skull, restored; from the Pliocene of the Siwalik Hills. $\frac{1}{16}$. (After Gaudry's 'Les Enchaînements.')

M. 2881. Cast of the middle portion of the cranium, showing m. 2 and m. 3 (imperfect) of both sides. The original (of which the place of preservation is not known) is figured by Falconer and Cautley, *op. cit.* pl. xxxiv. fig. 1, and pl. xxxix. fig. 7. The columns of the third true molar (which apparently had six ridges) are arranged less alternately than usual, and in this respect resemble a specimen figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xliv. fig. 1. *No history.*

M. 2861. (*Fig.*) Fragment of the left half of the cranium of a young individual, showing the broken mm. 4 and m. 1. Figured by Falconer and Cautley, *op. cit.* pl. xxxvi. figs. 2, 2 *a*. A more perfect example of mm. 4 is figured by the present writer, *op. cit.* pl. xli. fig. 2. In the figure the teeth are described as mm. 3 and mm. 4.

Cautley Collection. Presented, 1842.

M. 2864. (*Fig.*) Fragment of the left maxilla, containing m. 2 in a half-worn condition. Figured by Falconer and Cautley, *op. cit.* pl. xxxvi. fig. 4. The tooth has five ridges and a small talon. *Cautley Collection. Presented*, 1842.

40776. Fragment of the right maxilla, containing the half-worn m. 2, which has four ridges and a large talon.

Presented by C. Falconer, Esq., 1867.

16363. The much-worn second left upper true molar. This tooth exactly resembles an example from the opposite side figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xli. fig. 4 [1].

Cautley Collection. Presented, 1842.

M. 2858. A worn and shattered specimen of the second left upper true molar.

Transferred from the Old Indian Museum, 1880.

M. 2860. (*Fig.*) Fragment of the right maxilla, containing a small example of m. 3, in an early condition of wear and somewhat broken. Figured by Falconer and Cautley, *op. cit.* pl. xxxvi. figs. 5, 5 *a*. The tooth has five ridges and a talon. *Presented by Dr. Hugh Falconer.*

M. 2857. (*Fig.*) The third left upper true molar, in an early stage of wear. Figured by Falconer and Cautley, *op. cit.* pl. xxxvi. figs. 6, 6 *a*. *Cautley Collection. Presented*, 1842.

M. 2859. (*Fig.*) Fragment of the left maxilla, containing the third true molar, which has been vertically and longitudinally bisected. The section is figured by Falconer and Cautley, *op. cit.* pl. iii. fig. 10 *a*, and the uncut specimen in pl. xxxiv. figs. 2, 2 *a*.

Cautley Collection. Presented, 1842.

M. 2879. (*Fig.*) The mandible, showing the third true molar of either side in a well-worn condition. The tooth has six ridges and a talon; it exhibits very distinctly the characteristic pyriform dentine islets of the outer columns. The specimen is figured by Falconer and Cautley, *op. cit.* pl. xxxv. figs. 1, 1 *a*; the corresponding tooth of a very similar specimen being figured of the natural size by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xliv. fig. 3. *Cautley Collection. Presented*, 1842.

M. 2880. (*Fig.*) The greater portion of the mandible, containing the third true molars, of which the crowns have been broken off.

[1] Figured as *M. perimensis*, but referred to the present species in vol. iii. p. 151.

Figured by Falconer and Cautley, *op. cit.* pl. xviii. A. figs. 6, 6 *a*. *Cautley Collection. Presented*, 1842.

M. 2873. (*Fig.*) The symphysis and greater part of the left ramus of the mandible of a young individual, showing the base of $\overline{\text{mm. 2}}$, the complete $\overline{\text{mm. 3}}$, and the first ridge of $\overline{\text{mm. 4}}$ *in alveolo*. Figured by Falconer and Cautley, *op. cit.* pl. xxxvii. figs. 2, 2 *a*. $\overline{\text{mm. 3}}$ has three ridges, and the specimen agrees exactly in age with the mandible of *M. arvernensis*, No. 37247. *Cautley Collection. Presented*, 1842.

M. 2866. (*Fig.*) Fragment of the right ramus of the mandible of a slightly older individual, provisionally referred to this species; the broken bases of $\overline{\text{mm. 2}}$ and $\overline{\text{mm. 3}}$ and the alveolus of $\overline{\text{mm. 4}}$ are shown. Figured by Falconer and Cautley, *op. cit.* pl. xxxvii. figs. 1, 1 *a*.

Cautley Collection. Presented, 1842.

M. 2867. (*Fig.*) The symphysis and part of the right ramus of the mandible of an immature individual, showing $\overline{\text{mm. 4}}$ (broken anteriorly) and part of $\overline{\text{m. 1}}$ [1]. Figured by Falconer and Cautley, *op. cit.* pl. xxxvii. figs. 3, 3 *a*. A specimen of $\overline{\text{mm. 4}}$ (wanting the hind talon), which carries four ridges, is figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xliv. fig. 2.

Cautley Collection. Presented, 1842.

47888 a. (*Fig.*) Fragment of the right ramus of the mandible, containing the base of $\overline{\text{mm. 4}}$, and the complete $\overline{\text{m. 1}}$ in an early stage of wear (woodcut, fig. 12).

Presented by C. Falconer, Esq., 1867.

M. 2856. An imperfect specimen of the little-worn first left lower true molar.

Transferred from the Old Indian Museum, 1880.

M. 2868. (*Fig.*) Fragment of the right ramus of the mandible, containing the nearly perfect $\overline{\text{m. 1}}$ (?), which has four ridges and a large hind talon. Figured by Falconer and Cautley, *op. cit.* pl. xxxiv. figs. 3, 3 *a*.

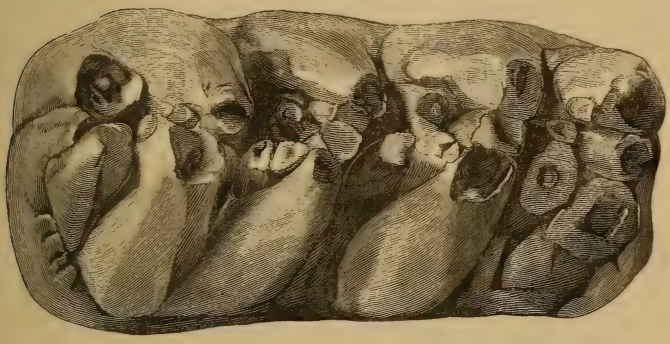
Cautley Collection. Presented, 1842.

[1] It is possible that the teeth of this and the next specimen may be one stage later in the series than they are here reckoned.

18788. An imperfect and half-worn second lower true molar.
Cautley Collection. Presented, 1842.

16381. Fragment of the left ramus of the mandible, with the imperfect $\overline{\text{m. 2}}$ not fully protruded.
Cautley Collection. Presented, 1842.

Fig. 12.



Mastodon sivalensis.—The first right lower true molar; from the Pliocene of the Siwalik Hills. $\frac{2}{3}$. The lower border of the figure is the outer border of the specimen.

M. 2874. (*Fig.*) Fragment of the right ramus of the mandible, containing $\overline{\text{m. 3}}$ in an early stage of wear. Figured by Falconer and Cautley, *op. cit.* pl. xxxvii. figs. 8, 8 *a*. The tooth has six ridges and a talon.
Transferred from the Old Indian Museum, 1880.

M. 2869. (*Fig.*) Fragment of the right ramus of the mandible, containing the much-worn $\overline{\text{m. 3}}$ (incomplete anteriorly). Figured by Falconer and Cautley, *op. cit.* pl. xxxvii. figs. 7, 7 *a*.
Cautley Collection. Presented, 1842.

M. 2865. (*Fig.*) Fragment of the left ramus of the mandible, containing the first four ridges of $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xxxvii. figs. 6, 6 *a*, the tooth being regarded as $\overline{\text{m. 2}}$. *Presented by Dr. Hugh Falconer.*

M. 2870. (*Fig.*) Fragment of the right ramus of the mandible, containing the hinder part of the much-worn $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xxxvii. figs. 5, 5 *a*.
Cautley Collection. Presented, 1842.

M. 2871. Fragment of the left ramus of the mandible, containing the hinder part of the half-worn $\overline{\text{m. 3}}$.
Cautley Collection. Presented, 1842.

M. 2863. (*Fig.*) Fragment of the right ramus of the mandible, containing the third true molar, which has been vertically and longitudinally bisected. The section is figured by Falconer and Cautley, *op. cit.* pl. iii. fig. 10 *b*.
Cautley Collection. Presented, 1842.

M. 2872. (*Fig.*) Fragment of the left ramus of the mandible, containing the little-worn $\overline{\text{m. 3}}$, imperfect anteriorly. Figured by Falconer and Cautley, *op. cit.* pl. xxxvii. figs. 4, 4 *a* (as ? $\overline{\text{m. 1}}$). *Presented by Dr. Hugh Falconer.*

16317. Middle part of the third right lower true molar, in an unworn condition. *Cautley Collection. Presented*, 1842.

M. 2862. (*Fig.*) Fragment of the third left lower true molar. Figured by Falconer and Cautley, *op. cit.* pl. xxxvi. fig. 3.
Cautley Collection. Presented, 1842.

16378. Hinder part of the third right lower true molar, in a half-worn condition. *Cautley Collection. Presented*, 1842.

M. 2875. (*Fig.*) A tooth, described by Falconer as the third (penultimate) upper milk-molar of this species. Figured by Falconer and Cautley, *op. cit.* pl. xxxvi. figs. 1, 1 *a*; in size this specimen agrees with $\overline{\text{mm. 2}}$.
Cautley Collection. Presented, 1842.

Mastodon arvernensis, Croizet and Jobert[1].

Syn. *Mastodon brevirostris*, Gervais[2].
Mastodon dissimilis, Jordan[3].
Anancus macroplus, Aymard[4].

This species is closely allied to the last, with which it agrees

[1] Oss. Foss. d. Puy-de-Dôme, p. 138 (1828).

[2] Ann. Sci. Nat. sér. 3, vol. v. (1854); see also Zool. et Pal. Françaises, 2nd ed. p. 67 (1859).

[3] Ann. Soc. Agric. Lyon, sér. 3, vol. ii. (1858), *teste* Depéret; see also Lortet and Chantre, Arch. Mus. Lyon, vol. ii. p. 297 (1878).

[4] Ann. Soc. Agric. Sci. le Puy, 1854, p. 597, *teste* Depéret.

in the short mandibular symphysis, the alternate arrangement of the columns of the cheek-teeth, the absence of premolars, and the vertically-grooved enamel of the milk-molars. It differs, however, by the slightly greater length of the mandibular symphysis, the absence of a tendency to the development of a pentalophodont ridge-formula, and the lesser complexity of the accessory tubercles of the molars. The columns of the ridges are very tall, and incline forwards in the lower teeth. In some adult molars the enamel is grooved, while in others it is quite smooth. A fourth upper milk-molar is figured in the accompanying woodcut (fig. 13); and full-sized figures of m. 3 are given by Fritsch in the Jahrb. k. preuss. geol. Land. 1884, pls. xxiii., xxiv.

Fig. 13.

Mastodon arvernensis.—The fourth left upper milk-molar; from the Norwich Crag of Postwick, Norfolk. ½. The lower border of the figure is the inner border of the specimen.

Hab. Europe. The species ranges in time from the Lower Pliocene of Montpellier to the Upper Pliocene of the Val d'Arno and the Norwich Crag; and has also a wide distribution in space, having been recorded from England, France[1], Italy[2], Germany, Croatia[3], &c. It should be observed that while the molars of the other species of *Mastodon* occurring in the Red Crag are usually much rolled, and therefore probably derived from older strata, those of the present species found in the same deposits are generally unaffected by rolling action.

[1] See Lortet and Chantre, Arch. Mus. Lyon, vol. ii. p. 297 (1878).
[2] See Forsyth-Major, Quart. Journ. Geol. Soc. vol. xli. p. 2 (1885).
[3] Vacek, Abh. k.-k. geol. Reichs. vol. vii. pt. 4, p. 36 (1877).

M. 2901. Cast of the third left upper milk-molar, in a half-worn condition. The original is from the Red Crag of Suffolk, and is preserved in the Museum at Ipswich; it precisely agrees with the corresponding tooth of the jaw figured by Lortet and Chantre in the Arch. Mus. Lyon, vol. ii. pl. vii. figs. 1, 1 *a*. *Made in the Museum*, 1885.

M. 2902. Cast of a rather larger and less worn example of the corresponding tooth of the opposite side. The original is from the Red Crag of Suffolk, and is preserved in the Ipswich Museum. *Made in the Museum*, 1885.

48935. The anterior half of the second (?) right upper (?) true molar; from a pit at Horstead, Norfolk.
Purchased, 1878.

M. 1983. (*Fig.*) The third left upper true molar (imperfect anteriorly), in an early stage of wear; from the Norwich Crag of Norfolk. This specimen is figured in the frontispiece to William Smith's 'Strata identified by Organic Fossils' (1816), and in Owen's 'British Fossil Mammals and Birds,' p. 276, fig. 97 (as *M. angustidens*), and by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxxvi. figs. 8, 8 *a*. *William Smith's Collection.*

M. 2903. Cast of the third left upper true molar, in a slightly more worn condition than the preceding. The original was dredged from the sea between Southwold and Easton, Suffolk, in 1839, and was probably derived from the Red Crag; it agrees precisely with the preceding specimen.
(?) *Presented by Captain Alexander*, 1842.

28997. The almost unworn crown of the third left upper true molar; from the Red Crag of Woodbridge, Suffolk. The hind talon is rather less distinct in this than in the preceding specimens. *Purchased*, 1854.

42022. The last two ridges and talon of the third right upper true molar; from the Red Crag of Suffolk. *Purchased*, 1870.

37246. The inner half of the hinder portion of the third right upper true molar, in an unworn condition; from the Norwich Crag. *Wigham Collection. Purchased*, 1859.

37339. Cast of the third right upper true molar. The original is

from the Upper Pliocene of the Val d'Arno (Tuscany), Italy, and is preserved in the Museum at Pisa.

Purchased, 1862.

37339 a. Cast of the left ramus of the mandible, showing $\overline{\text{m. 1}}$ and $\overline{\text{m. 2}}$, and $\overline{\text{m. 3}}$ *in alveolo*. The original is from the Val d'Arno, and is preserved in the Museum at Pisa.

Purchased, 1862.

37338. Cast of the greater part of an immature mandible, showing $\overline{\text{m. 2}}$, and a portion of $\overline{\text{m. 3}}$ *in alveolo*. The original is from the Val d'Arno, and is preserved in the Museum at Pisa. *Purchased*, 1862.

29000. A tooth provisionally regarded as the second left lower milk-molar of this species; from the Red Crag of Suffolk.

Purchased, 1854.

43483. The first two ridges of the third left lower milk-molar, in a half-worn condition; from the Red Crag of Suffolk.

Purchased, 1872.

46920. The fourth left lower milk-molar, in a well-worn condition, and with the fourth ridge incomplete; from the Red Crag near Woodbridge. *Purchased*, 1875.

37247. (*Fig.*) Part of the right ramus of the mandible of a young individual, showing $\overline{\text{mm. 2}}$ and $\overline{\text{mm. 3}}$ in use, and $\overline{\text{mm. 4}}$ *in alveolo*; from the Upper Pliocene of Perrier (Puy-de-Dôme), France. Figured in De Blainville's 'Ostéographie,' Genus *Elephas*, pl. xiv.

Croizet Collection. Purchased, 1848.

44628. The germ of the first right lower true molar; from the Red Crag near Felixstowe, Essex. *Purchased*, 1873.

27645. The greater portion of the third right lower true molar, in a half-worn condition; from the Upper Pliocene of Bourbon, near Issoire (Puy-de-Dôme).

Croizet Collection. Purchased, 1848.

M. 2905. Cast of the hinder portion of a well-worn example of the third left lower true molar. The original was obtained from the Norwich Crag of Thorpe, Norwich. *No history.*

M. 2904. Cast of the hinder portion of a little-worn example of the

third right lower true molar. The original, which is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxxvii. fig. 9, was found on the shore at Sizewell Gap, between Southwold and Easton, Suffolk, and was probably derived from the Red Crag; it is noticed in the Proc. Geol. Soc. vol. iii. p. 10 (1842).
(?) *Presented by Capt. Alexander*, 1842.

36654. The unworn last two ridges and talon of the third left lower true molar; from the Red Crag.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

43188, 45845. Two fragments of early milk-molars; from the Red Crag. *Purchased.*

27851, 28253, 28983, 42729. Four fragments of true molars; from the Red Crag. *Purchased.*

The specific reference of the following specimens is provisional.

40836. Cast of a portion of an upper incisor. The original is from the Norwich Crag, and is figured in Owen's 'British Fossil Mammals and Birds,' p. 291, fig. 101, as a lower incisor of *M. angustidens*. *Presented by C. Falconer, Esq.*, 1867.

27852. Tip of an incisor; from the Red Crag of Sutton, Suffolk.
Presented by John Brown, Esq., 1852.

33192. A proximal phalangeal; from the Red Crag at Easton, Suffolk. *Purchased. About* 1856.

Mastodon perimensis, Falconer and Cautley[1].

Syn. *Tetrabelodon perimensis*, Cope[2].

The cheek-teeth of this species are narrow, and contain a considerable amount of cement in their valleys; their columns, which are arranged somewhat alternately, are tall and comparatively thin antero-posteriorly; a trefoil is formed on one column of each ridge, and the valleys are almost completely blocked by accessory tubercles. There is a large hind talon to the upper "intermediate" molars, and the third upper true molar is moderately tapering posteriorly, its

[1] Fauna Antiqua Sivalensis, pt. 4, pl. xxxi. (1847).
[2] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).

hind talon consisting of large cusps. The mandibular symphysis is unknown[1], and the milk-molars have not yet been determined; it is uncertain whether premolars were developed.

Hab. India (Perim Island)[2].

M. 2882. (*Fig.*) The imperfect cranium, showing the broken bases of m. 2 and m. 3 of either side; from the Pliocene Siwaliks of Perim Island, Gulf of Cambay, India. This specimen is the type, and is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pls. xxxviii., xxxix. The molars are nearly parallel, with a comparatively narrow interval between them. The dimensions of m. 2 are 0,115 × 0,078, and those of m. 3 0,177 × 0,080.

Presented by Captain G. Fulljames, 1849.

40679. The palate, showing the worn m. 2 and the unworn but broken m. 3 of either side; from Perim Island. This specimen corresponds exactly with the palate of the last specimen; the dimensions of the base of m. 2 being 0,120 × 0,078, and those of m. 3 0,179 × 0,080. The third molar is too imperfect to afford a satisfactory figure; it has five ridges and a small hind talon, the ridges being rather narrow, the valleys much blocked, and the hinder extremity moderately tapering.

Presented by C. Falconer, Esq., 1867.

M 2851. Cast of the germ of the second left upper true molar, imperfect anteriorly. The original is from Perim Island, and is preserved in the Indian Museum, Calcutta (No. A 355); it is figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. iii. pl. xvii. fig. 8 (the figure being reproduced in woodcut, fig. 14). The dimensions of this specimen are 0,138 × 0,081; and it appears (allowing for the worn condition of the one) to agree exactly with the corresponding tooth of No. 40679, and also with the specimen of the opposite side figured in 'Falconer's Palæontological Memoirs,' vol. i. pl. ix. fig. 6.

Made in the Museum, 1885.

[1] The specimens figured in the 'Palæontologia Indica,' ser. 10, vol. i. pls. xl.–xlii. (except pl. xli. fig. 4), are now referred to a distinct species (*M. punjabiensis, q. v.*).

[2] A tooth from China figured by Koken in the Pal. Abhand. vol. iii. pt. 2, pl. vii. fig. 1 (1885), under this name is probably specifically distinct.

Fig. 14.

Mastodon perimensis.—The second left upper true molar, in an unworn condition; from the Siwaliks of Perim Island. $\frac{2}{3}$. *a*. External accessory tubercles. The lower border of the figure is the inner border of the specimen. (From the 'Palæontologia Indica.')

14744. A half-worn and partially broken second right upper true (*Fig.*) molar, referred by Falconer and Cautley to the present species, and figured by them, *op. cit.* pl. xxxi. figs. 9, 9 *a*.
Presented by Miss Pepper. Before 1846.

M. 256. The hinder half of the partially worn third left upper true molar; from Perim Island. This tooth is apparently very similar to $\overline{\text{m. 3}}$ of No. 40679, and shows the characteristic narrow, subalternate, columns and a large amount of cement in the valleys. *Purchased*, 1882.

M. 2852. Cast of part of the right ramus of the mandible, with the half-worn $\overline{\text{m. 3}}$. The original is from Perim Island, and is figured by Falconer and Cautley, *op. cit.* pl. xxxi. figs. 11, 11 *a*; there is a large amount of cement.
Presented by the Directors of the Hon. East India Company, 1846.

23150. Fragment of the right ramus of the mandible, containing $\overline{\text{m. 3}}$ in an early stage of wear; from Perim Island. Cement is abundant. *Presented by Dr. Beust*, 1849.

40800. Fragment of the left ramus of the mandible, with the well-worn and imperfect $\overline{\text{m. 3}}$; from Perim Island.
Presented by C. Falconer, Esq., 1867.

The following specimens probably belong either to this species or to M. cautleyi; *in cases where the cement has fallen out, it appears difficult to distinguish lower molars of the present species from those of the latter.*

M. 2853. Fragment of the right ramus of a mandible, containing a broken tooth, which is apparently $\overline{\text{mm. 3}}$; from Perim Island. *No history.*

14739. Part of the left ramus of the mandible, containing the broken base of $\overline{\text{mm. 3}}$, and the unworn $\overline{\text{mm. 4}}$ (imperfect anteriorly); from Perim Island. This specimen very probably belongs to *M. cautleyi*.
Presented by Miss Pepper. Before 1846.

14746 a. (*Fig.*) Two ridges of the first (?) left lower true molar; from Perim Island. Figured by Falconer and Cautley, *op. cit.* pl. xxxi. fig. 1 (as an upper milk-molar of *M. latidens*).
Presented by Miss Pepper. Before 1846.

14746. (*Fig.*) Three unworn ridges of the second (?) right lower true molar; from Perim Island. Figured by Falconer and Cautley, *op. cit.* pl. xl. figs. 4, 4*a* (as an upper tooth).
No history.

14740. (*Fig.*) Fragment of the left ramus of the mandible, containing the greater part of $\overline{\text{m. 2}}$ and the first ridge of $\overline{\text{m. 3}}$; from Perim Island. Figured by Falconer and Cautley, *op. cit.* pl. xxxi. figs. 10, 10 *a*.
Presented by Miss Pepper. Before 1846.

40777. Four ridges of the third (?) lower true molar; from Perim Island. *Presented by C. Falconer, Esq.*, 1867.

M. 257. The hinder half of the little-worn third right lower true molar; from Perim Island. *Purchased*, 1882.

23150 a. Part of the right ramus of the mandible with fragments of two molars; from Perim Island.
Presented by Dr. Beust, 1849.

See p. 233

Mastodon punjabiensis, Lydekker, n. sp.

The specimens[1] on which this species is founded were originally referred to *M. perimensis*, while one of them was subsequently classed with *M. cautleyi*. The cheek-teeth are narrow, and have no appreciable amount of cement, the last true molar being still more elongated than in *M. perimensis*. There is no distinctly alternate arrangement of the columns, which are very tall and of great antero-posterior thickness. The first upper true molar (and probably, therefore, the adjacent teeth) can scarcely be distinguished from the corresponding tooth of *M. cautleyi*, although its columns are perhaps somewhat stouter. There is a cingulum on the inner side of the upper true molars; the valleys are completely blocked, and a trefoil is formed on one column of each ridge. Premolars were present, and the mandibular symphysis is short, and in some instances tuskless[2]. The species appears to be a more specialized form allied to *M. longirostris*, and the resemblance of its m. 1 to that of *M. cautleyi*, which is indistinguishable from the same tooth in *M. longirostris*, shows that isolated "intermediate" molars are not always sufficient for specific diagnosis.

Hab. India (Punjab).

M. 2855. Cast of the third left upper true molar, in an early stage of wear. The original was obtained from the Pliocene Siwaliks of the Punjab, and is preserved in the Indian Museum, Calcutta (No. A 46); it is figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xlii. (as *M. perimensis*). Its dimensions are 0,242 × 0,093; it differs widely from the corresponding tooth of *M. perimensis* (No. 40679), and still more from that of *M. cautleyi* (No. M. 2705); there are five ridges and a very narrow hind talon, consisting of three large columns, which are not arranged in a transverse line.

Made in the Museum, 1886.

M. 3428. Cast of a fragment of the left maxilla, containing pm. 4 and m. 1. The original is from the Punjab, and is preserved in the Indian Museum (No. A 48); it is figured by the present writer, *op. cit.* vol. i. pl. xl. (as *M. perimensis*), and noticed in vol. iii. p. xiv (as *M. cautleyi*).

Made in the Museum, 1886.

[1] All the specimens from the Punjab included under *M. perimensis* in the 'Cat. Siwalik Vert. Ind. Mus. Calcutta,' pt. i. pp. 97-99 (1885).

[2] *Ibid.* p. 98, No. A 84.

M. 3427. Cast of the unworn second (?) left lower true molar. The original is from the Punjab, and is preserved in the Indian Museum (No. A 54); it is figured by the present writer, *op. cit.* vol. i. pl. xli. fig. 1 (as *M. perimensis*). The broken portion of the original has been restored in the cast.

Made in the Museum, 1886.

The following specimen may perhaps belong to this species.

M. 2854. The hinder half of the well-worn third left lower true molar; from the Siwaliks, but locality unknown. In its crenulated cingulum, absence of cement, and narrow hinder extremity, this specimen agrees very closely with the last upper molar (No. M. 2855).

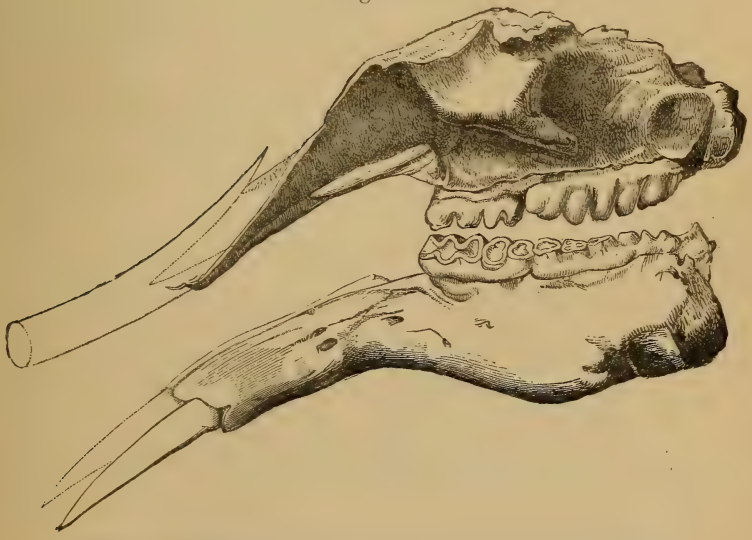
Transferred from the Old Indian Museum, 1880.

Mastodon longirostris, Kaup[1].

Syn. *Tetrabelodon longirostris*, Cope[2].

In this species, of which an imperfect skull is represented in the accompanying woodcut (fig. 15), the mandibular symphysis is

Fig. 15.



Mastodon longirostris.—Skull; from the bone-sand of Eppelsheim. Much reduced.

[1] Oss. Foss. d. Darmstadt, pt. iv. p. 65 (1835).
[2] Proc. Amer. Phil. Soc. vol. xxii. p. 5 (1884).

elongated and deflected, and carries a pair of short, subcylindrical incisors. The columns of the cheek-teeth are separated by a deep longitudinal cleft, but are arranged in the same transverse line; the accessory tubercles are of moderate size, and one column of each of the earlier ridges wears into a distinct trefoil; the valleys are but slightly blocked, and do not contain any appreciable amount of cement. Premolars are present. The last upper true molar usually has a large and complex hind talon; the inferior border of the mandibular ramus is highly convex, and the incisive alveoli diverge anteriorly.

Hab. Europe (England[1], Germany, France[2], and Austria-Hungary[3]). The English specimens are from the Red Crag. The species occurs in the ossiferous sands of Eppelsheim and the Congerian stage of the Vienna basin; and is thus of the same homotaxial age as *M. cautleyi* of the Pliocene of Western India.

M. 2907. Cast of the palatal half of the cranium, showing the second and third true molars of either side. The original was obtained from the bone-sand of Eppelsheim, Hessen-Darmstadt, and is described and figured by Kaup in the Oss. Foss. d. Darmstadt, pt. 4, p. 75, pl. xvi. fig. 5, and pl. xix. fig. 1; it forms the upper half of the specimen figured in woodcut, fig. 15. *Purchased.*

M. 2908. Cast of the palate, showing the much-worn m. 1 on the right side, and the little-worn m. 2 of both sides. The original is from Eppelsheim, and is described and figured by Kaup, *op. cit.* p. 74, pl. xvi. fig. 4. *Purchased.*

21485. The palate, showing m. 2 of either side in an early condition of wear; from Eppelsheim. *Purchased*, 1847.

M. 2909. Cast of a portion of the left half of the cranium of a young individual, showing the three milk-molars, of which the first two are well-worn. The original (woodcut, fig. 16) is from Eppelsheim, and is described and figured by Kaup, *op. cit.* p. 69, pl. xvi. figs. 1, 1 *a*. *Purchased.*

[1] *Vide infrà.*

[2] Lortet and Chantre, Arch. Mus. Lyon. vol. ii. p. 304 (1878).

[3] Vacek, Abh. k.-k. geol. Reichs. vol. vii. pt. 4, pp. 25–33 (1877). The species occurs in the Belvedere zone of the Congerian stage.

Fig. 16.

Mastodon longirostris.—The left upper milk-molars; from the bone-sand of Eppelsheim. ¼. (After Gaudry's 'Enchaînements.')

M. 2910. Cast of the germ of the third left upper premolar, the original of which was *in alveolo* in the original of the preceding specimen. The original is described and figured by Kaup, *op. cit.* p. 70, pl. xvi. fig. 3. *Purchased.*

21615. (*Fig.*) Fragment of the left maxilla of a young individual, showing the three milk-molars, which are less worn than in No. M. 2909; from Eppelsheim. This specimen is figured by Kaup, *op. cit.* pl. xx. fig. 2, and by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xl. figs. 6, 6 *a*[1]. *Presented by the Earl of Enniskillen*, 1847.

1262. The third left upper milk-molar in a very early condition of wear; from Eppelsheim. *Purchased.*

M. 2911. Cast of the germ of the third left upper milk-molar. The original is from Eppelsheim, and is described and figured by Kaup, *op. cit.* pl. xvii. fig. 12.
Egerton Collection. Purchased, 1882.

M. 2912. Cast of the fourth right upper milk-molar, in an early stage of wear. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xvii. fig. 14. *Purchased.*

M. 2924. Cast of the well-worn fourth right upper milk-molar.

[1] Erroneously described as the lower jaw.

The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xvii. fig. 13. *Purchased.*

M. 2925. Cast of the third upper premolar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xvii. fig. 1. *Egerton Collection. Purchased*, 1882.

M. 2913, 2914, 2926. Three casts of specimens of the fourth upper premolar. The originals are from Eppelsheim, and are figured by Kaup, *op. cit.* pl. xvii. figs. 3, 4, 5. *Purchased.*

M. 2915. Cast of a very large example of the fourth left upper premolar in a half-worn condition. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xvii. fig. 7. *Purchased.*

M. 161. A well-worn specimen of the fourth left upper premolar; from Eppelsheim.
Enniskillen Collection. Purchased, 1882.

M. 2916. Cast of the germ of the first left upper true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xxi. fig. 7. *Purchased.*

M. 138. The germ of the first right upper true molar, imperfect anteriorly; from Eppelsheim.
Enniskillen Collection. Purchased, 1882.

M. 2917. Cast of the first right upper true molar, in a well-worn condition. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xxi. fig. 6. *Purchased.*

36760. The germ of a larger example of the first left upper true molar; from Eppelsheim. *Purchased*, 1858.

19435 d. The well-worn second right upper true molar, imperfect posteriorly; from Eppelsheim. *Purchased*, 1845.

M. 135. The second right upper true molar, in an early condition of wear; from Eppelsheim.
Enniskillen Collection. Purchased, 1882.

27471. The slightly worn second right upper true molar; from Eppelsheim. *Hastings Collection. Purchased*, 1855.

27237. (*Fig.*) The germ of the second right upper true molar; from Eppelsheim. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxxvi. figs. 11, 11 *a*.

Purchased.

M. 136. The second left upper true molar, in a worn and crushed condition; from Eppelsheim.

Enniskillen Collection. Purchased, 1882.

M. 2927. Cast of the well-worn second left upper true molar. The original is from Eppelsheim. *Purchased.*

M. 2918. Cast of the germ of the second left upper true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xx. fig. 3. *Purchased.*

48427. Cast of the first three ridges of the second or third left upper true molar, in which the valleys are blocked by matrix. The original is from the Red Crag of Suffolk, and is described and figured by Lankester in the Quart. Journ. Geol. Soc. vol. xxvi. pp. 507–509, pl. xxxiv. figs. 1 & 2 (1870), as the complete molar of a trilophodont species. The specimen has, however, lost a ridge, and agrees precisely with the corresponding portion of the molars of the present species[1]; it is noticed in a paper by the present writer on Crag Vertebrata in the Quart. Journ. Geol. Soc. vol. xlii. p. 365 (1886).

Presented by Prof. E. R. Lankester, 1870.

28253. The anterior talon and part of the first ridge of the third right upper true molar; from the Red Crag of Woodbridge, Suffolk. Noticed by Lankester, *op. cit.* p. 508 (as belonging to a trilophodont species).

Purchased, 1852.

28994. The inner portion of the unworn anterior talon and first ridge of the third right upper true molar; from the Red Crag. Noticed by Lankester, *op. cit.* *Purchased*, 1854.

27468. The unworn first three ridges of the third right upper true molar; from Eppelsheim.

Hastings Collection. Purchased, 1855.

M. 2928. The germ of the third right upper true molar; from

[1] In a note on page 508 of Lankester's memoir it is stated that Lartet regarded the specimen as belonging to *M. longirostris*.

Eppelsheim. In this and the six following specimens there are five ridges and a complex hind talon.
Purchased.

19435 a. The germ of the third right upper true molar; from Eppelsheim. *Purchased*, 1845.

M. 2919. Cast of the third right upper true molar in an early stage of wear. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xviii. fig. 9, and by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxxvi. fig. 12. *Purchased.*

M. 2920. Cast of the germ of the third right upper true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xviii. fig. 7. *Purchased.*

26469. The germ of the third left upper true molar; from Eppelsheim. *Purchased.*

M. 2929. The germ of the third left upper true molar; from Eppelsheim. *Purchased.*

M. 2921. Cast of the partially worn third left upper true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xviii. fig. 8. *Purchased.*

M. 137. The germ of the third right upper true molar; from Eppelsheim. In this and the four following specimens (which are all of small size) the hind talon is always smaller than in the seven preceding specimens, and in some instances is very minute.
Enniskillen Collection. Purchased, 1882.

M. 2922. Cast of the slightly worn third right upper true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xviii. fig. 4, and by Falconer and Cautley, *op. cit.* pl. xxxvi. fig. 13. *Purchased.*

M. 2930. Cast of the partially-worn third left upper true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xviii. fig. 3. *Purchased.*

M. 2923. Cast of the germ of the third left upper true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xviii. fig. 2. *Purchased.*

21486. The partially-worn third left upper true molar; from Eppelsheim. *Purchased*, 1847.

M. 145. Part of an upper incisor; from Eppelsheim.
Enniskillen Collection. *Purchased*, 1882.

36753. The greater part of the two mandibular rami and part of the symphysis, with the well-worn $\overline{\text{m. 3}}$ of either side; from Eppelsheim. *Purchased*, 1858.

M. 2936. Cast of the symphysis and left ramus of the mandible of a female (?), showing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xix. figs. 1, 2. There is no trace of incisors.
Enniskillen Collection. *Purchased*, 1882.

M. 2931. Cast of part of the left ramus of the mandible, containing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$. The original is from Eppelsheim, and is figured by Kaup in the 'Beiträge,' pt. 3, pl. ii. fig. 3 (as *M. arvernensis*). *Purchased.*

M. 2932. Cast of part of the left ramus of the mandible, showing $\overline{\text{m. 1}}$ and m. 2, and $\overline{\text{m. 3}}$ *in alveolo*. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. ii. fig. 1 (as *M. arvernensis*). *Purchased.*

M. 2933. Cast of part of the right ramus of the mandible, showing $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$. The original is from Eppelsheim.
Purchased.

M. 2934. Cast of part of the right ramus of the mandible, showing a fragment of the much-worn $\overline{\text{m. 2}}$ and the complete $\overline{\text{m. 3}}$. The original is from Eppelsheim, and is figured by Kaup in the Oss. Foss. d. Darmstadt, pt. 4, pl. xix. fig. 3.
Purchased.

M. 2935. Cast of part of the right ramus of the mandible, showing $\overline{\text{m. 1}}$ and $\overline{\text{m. 2}}$. The original is from Eppelsheim.
Purchased.

36756. Cast of part of the left ramus of the mandible of a young individual, showing $\overline{\text{mm. 4}}$ in use, and $\overline{\text{pm. 3}}$ and $\overline{\text{m. 1}}$ *in alveolo*. The original is from Eppelsheim, and is figured by Kaup in the 'Beiträge,' pt. 3, pl. ii. fig. 2 (as *M. arvernensis*). *Purchased*, 1858.

27471 x. Part of the left ramus of the mandible of a young individual, showing $\overline{\text{mm. 4}}$ in a half-worn condition, and $\overline{\text{pm. 3}}$ *in alveolo*; from Eppelsheim.
Hastings Collection. *Purchased*, 1855.

1735 z. Cast of the unworn third left lower milk-molar. The original is from Eppelsheim, and is figured by Kaup in the 'Beiträge,' pt. 3, pl. ii. fig. 8 (as *M. arvernensis*); it exhibits three distinct ridges. *Purchased. Before* 1836.

36761. Cast of the third right lower premolar. The original is from Eppelsheim. *Purchased*, 1858.

19435 n. The much-worn third right lower premolar; from Eppelsheim. *Purchased*, 1845.

M. 2902 a. Cast of a third left lower premolar; probably belonging to this species. The original is from the Red Crag of Suffolk, and is preserved in the Ipswich Museum; it is in a rolled but unworn condition, and agrees in size with the corresponding tooth in No. 36756.
Made in the Museum, 1886.

M. 2938. Cast of the partially-worn fourth right lower premolar. The original is from Eppelsheim. *Purchased.*

M. 2939. Cast of the slightly-worn fourth right lower premolar. The original is from Eppelsheim. *Purchased.*

M. 162. The partially-worn fourth left lower premolar; from Eppelsheim. *Enniskillen Collection. Purchased*, 1882.

M. 2940. Cast of the half-worn fourth right lower premolar. The original is from Eppelsheim, and is figured by Kaup in the Oss. Foss. d. Darmstadt, pt. 4, pl. xvii. fig. 11.
Purchased.

M. 2941. Cast of the half-worn first right lower true molar. The original is from Eppelsheim, and is figured by Kaup in the Oss. Foss. d. Darmstadt, pt. 4, pl. xxi. fig. 2.
Purchased.

M. 2942. Cast of a rather larger, but equally worn, example of the first left lower true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xix. fig. 5.
Purchased.

36759. The germ of the second right lower true molar; from Eppelsheim. *Purchased*, 1858.

M. 2943. Cast of the almost unworn second left lower true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xix. fig. 4. *Purchased.*

21267. The much-worn second right lower true molar; from Eppelsheim. *Purchased*, 1847.

27470. The second left lower (?) true molar, in a half-worn condition; from Eppelsheim.
Hastings Collection. Purchased, 1855.

M. 2944. Cast of the second right lower (?) true molar, in a half-worn condition. The original is from Eppelsheim.
Purchased.

46001. An imperfect second left lower true molar, apparently belonging to the present species; from the Red Crag of Suffolk. This specimen is in a half-worn condition and has been considerably rolled. The first ridge has been broken away, but a fragment still remains. The other three ridges and the hind talon appear to be identical with the corresponding portions of the Eppelsheim specimen No. 21267. *Purchased*, 1874.

19435 b. The crown of the third left lower true molar, with the outer column of the first ridge just touched by wear; from Eppelsheim. *Purchased*, 1845.

M. 2945. Cast of the germ of the third left lower true molar. The original is from Eppelsheim, and is figured by Kaup, *op. cit.* pl. xx. fig. 5. *Purchased.*

M. 2946. Cast of the half-worn third right lower true molar. The original is from Eppelsheim. *Purchased.*

19435 m. A slightly imperfect abnormal specimen of the third right lower true molar, in an early stage of wear; from Eppelsheim. *Purchased*, 1845.

M. 163. The little-worn third right lower true molar in a fragment of the mandible; from Eppelsheim.
Enniskillen Collection. Purchased, 1882.

M. 134. The partially-worn third left lower true molar, imperfect anteriorly; from Eppelsheim.
Enniskillen Collection. Purchased, 1882.

19435 e. The hinder portion of a small example of the third left lower true molar; from Eppelsheim. *Purchased*, 1845.

19435 f. The last three ridges of the unworn third left lower true molar; from Eppelsheim. *Purchased*, 1845.

27850. The hinder portion of a third right lower true molar, provisionally referred to this species; from the Red Crag of Sutton. Noticed by Lankester in the Quart. Journ. Geol. Soc. vol. xxvi. p. 508, as belonging to a trilophodont species. *Presented by John Brown, Esq.*, 1852.

28253, 42729. Two fragments of molars from the Red Crag of Woodbridge, Suffolk, which may perhaps belong to the present species. *Purchased*, 1852.

19947. Termination of a lower (?) incisor; from Eppelsheim. *Purchased*, 1845.

M. 164. The atlas vertebra; from Eppelsheim. *Enniskillen Collection.* *Purchased*, 1882.

M. 3408. Cast of the axis vertebra. The original is from Eppelsheim, and is figured by Kaup in the Oss. Foss. d. Darmstadt, pt. 4, pl. xxii. fig. 2. *Purchased.*

21487. A lumbar vertebra; from Eppelsheim. *Purchased*, 1847.

Mastodon atticus, Wagner[1].

This species is regarded by Vacek[2] as closely allied to *M. longirostris*, but presents rather more specialized characters. The mandibular symphysis is unknown; a specimen of m. 3 figured by Vacek[3] has six ridges and a hind talon.

Hab. Greece.

37353. Cast of a portion of the maxilla, containing mm. 2 and mm. 3 in an unworn condition, the latter tooth having three ridges. The original is from the Lower Pliocene of Pikermi, Attica, and is figured by Wagner in the Abh. math.-phys. Cl. k.-bay. Ak. Wiss. vol. viii. pl. vii. fig. 16 (as *M. atticus*), and by Gaudry in the 'Animaux Fossiles et Géologie de l'Attique,' pl. xxiii. figs. 2, 3, under the name of *M. pentelici*: it has been shown by Vacek (*op. cit.*) to belong to a tetralophodont species. The third milk-molar is considerably larger than any of the examples of mm. 3 of *M. longirostris* in the Museum. *Purchased*, 1863.

[1] Abh. math.-phys. Cl. k.-bay. Ak. Wiss. vol. viii. pt. 1, p. 140 (1857), erroneously quoted as from Gaudry and Lartet.

[2] Abh. k.-k. geol. Reichs. vol. vii. pt. 4, pp. 32, 33, 45 (1877).

[3] *Ibid.* pl. vii. figs. 1, 1*a*.

Mastodon cautleyi, Lydekker [1].

This provisional species connects the European *M. longirostris* with the Asiatic *M. latidens*. The mandibular symphysis is not known. The upper molars are relatively wide, with comparatively high transverse ridges, obstructed valleys, and a somewhat fluted enamel. The inner columns wear into very distinct trefoils, the hind talons are very small, there is usually a cingulum on the inner border, and the third molar [2] is comparatively short and has five ridges and a narrow single hind talon. The lower molars cannot in many cases be satisfactorily distinguished from those of *M. latidens*. Premolars are probably present, and there is no cement. That the present form passes insensibly into *M. latidens* is quite evident, and its right to specific distinction is perhaps doubtful; as far, however, as the "intermediate" molars are concerned, it might equally well be included in *M. longirostris*, as these teeth are practically indistinguishable.

Hab. Western India (Perim Island).

M. 2492. (*Fig.*) Fragment of the right maxilla of a young individual probably belonging to this species containing mm. 2 and mm. 3; from the Pliocene Siwaliks of Perim Island, Gulf of Cambay. Figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. iii. pl. xvii. fig. 1 (as ? *M. perimensis*).
Presented by Diwán Wajeshankar Gowreeshankar, 1885.

40778. (*Fig.*). An almost unworn third left upper milk-molar; from Perim Island. Figured by the present writer, *op. cit.* pl. xvii. figs. 3, 3 *a* (as *M. perimensis*), and noticed on page xix of the same volume. *Presented by C. Falconer, Esq.*, 1867.

M. 3432. A very similar, but rather more worn third left upper milk-molar; from Perim Island. The resemblance of this tooth to the two following specimens leaves little doubt as to the specific reference; the enamel is more rugose than in the later teeth, but the characteristic inner cingulum is present; the corresponding tooth referred to *M. latidens* (No. M. 3424, p. 74) is wider than No. 40778, but less different from the present specimen.
Presented by Col. J. W. Watson, 1886.

M. 2884. (*Fig.*) The germ of the fourth right upper milk-molar; from Perim Island. Figured by Falconer and Cautley in the

[1] Palæontologia Indica (Mem. Geol. Surv. Ind.), ser. 10, vol. iii. p. xiv (1886).
[2] Only one specimen is known.

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'Fauna Antiqua Sivalensis,' pl. xl. figs. 2, 2 *a* (as *M. latidens*), and noticed by the present writer, *op. cit.* p. xiv. *No history.*

M. 3433. The germ of the fourth right upper milk-molar; from Perim Island. This specimen differs from the last in having accessory tubercles on the outer side of the median longitudinal valley; there is a strongly-marked inner cingulum. *Presented by Col. J. W. Watson*, 1886.

M. 3434. The partially-worn and broken fourth right upper milk-molar; from Perim Island. This specimen agrees precisely with the last.

Presented by Col. J. W. Watson, 1886.

M. 2817. (*Fig.*) The germ of the first left upper true molar; from Perim Island. Figured by Falconer and Cautley, *op. cit.* pl. xl. figs. 3, 3 *a* (as *M. latidens*), and by the present writer, *op. cit.* vol. iii. p. xv, fig. 5, the latter figure being reproduced in the accompanying woodcut (fig. 17). *No history.*

Fig. 17.

Mastodon cautleyi.—The first left upper true molar in an unworn condition; from the Siwaliks of Perim Island. ¼. The lower border of the figure is the inner border of the specimen.

M. 2887. Cast of the germ of the first three ridges of the second right upper true molar. The original is from Perim Island, and is preserved in the Indian Museum, Calcutta (No. A

437); it is figured by the present writer, *op. cit.* vol. iii. pl. xvi. fig. 2 (as *M. perimensis*), and noticed on p. xiv of the same volume. *Made in the Museum*, 1886.

M. 2705. (*Fig.*) The germ of the third left upper true molar; from Perim Island. Figured by Falconer and Cautley, *op. cit.* pl. xxxi. figs. 6, 6 *a* (as *M. latidens*), and by the present writer, *op. cit.* vol. iii. p. xv, fig. 6, the latter figure being reproduced in the accompanying woodcut (fig. 18). This tooth has a very narrow hind talon, consisting of a single row of small tubercles, and is very different from the corresponding tooth of *M. perimensis* (No. 40679), *M. punjabiensis* (No. M. 2855), and *M. latidens* (Nos. M. 2498 and M. 3426). *No history.*

Fig. 18.

Mastodon cautleyi.—The third left upper true molar, in an unworn condition; from the Siwaliks of Perim Island. ½. The lower border of the figure is the inner border of the specimen.

The specific reference of the following specimens is provisional.

M. 2495. The much-worn fourth left lower premolar; from Perim Island.

Presented by Diwán Wajeshankar Gowreeshankar, 1885.

M. 2494. (*Fig.*) Fragment of the right ramus of the mandible of a young individual, showing the imperfect $\overline{\text{mm. 3}}$, and the broken base of $\overline{\text{mm. 4}}$; from Perim Island. The tooth is figured

by the present writer, *op. cit.* vol. iii. pl. xvii. fig. 4 (as *M. perimensis*).

Presented by Diwán Wajeshankar Gowreeshankar, 1885.

M. 3435. The first two ridges of the unworn second right lower true molar; from Perim Island.

Presented by Col. J. W. Watson, 1886.

Mastodon latidens, Clift[1].

This species forms the connecting-link between *M. cautleyi* and *Elephas clifti*, and unites the two so closely that it is frequently a matter of extreme difficulty to refer individual teeth to their respective species. The mandibular symphysis is not certainly known, but it was probably short and tuskless. The upper molars are very wide, with no cingulum and relatively low transverse ridges, the median longitudinal cleft being frequently indistinct, the accessory tubercles small and the valleys comparatively open, the trefoils on the worn ridges imperfect, and the worn dentine surfaces on the inner and outer columns soon uniting. The hind talons are very large, while the inner border of the crown is concave and without a distinct cingulum; a fifth ridge is sometimes present in m. 2[2]; and the hind talon of m. 3 is always large, and may sometimes be reckoned as a sixth ridge. The enamel is very thick, and in the hinder teeth quite smooth; cement is usually absent, and premolars were probably developed. Those molars in which the ridges are relatively taller and the accessory columns more developed pass imperceptibly into *M. cautleyi*, while those in which these features are less developed and the median cleft more indistinct lead insensibly on to *Elephas clifti*.

Hab. India (Perim Island, Sind, Punjab, and Siwalik Hills), Burma, and Borneo[3].

M. 3424. Cast of a third left upper milk-molar provisionally referred to this species; from the Pliocene Siwaliks of the Punjab. The original is preserved in the Indian Museum, Calcutta (No. A 65), and is figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xxxvii. fig. 4, where it is referred to the right side.

Made in the Museum, 1886.

7392. Cast of a little-worn right upper tooth, which is probably mm. 4 or m. 1. The original was obtained by Crawfurd in

[1] Trans. Geol. Soc. ser. 2, vol. ii. pt. 3, p. 371 (1828).

[2] Palæontologia Indica, ser. 10, vol. i. pl. xxxviii. fig. 1.

[3] Lydekker, Proc. Zool. Soc. 1885, p. 777, pl. xlviii.

1826, from the Pliocene Siwaliks near Yenankhoung, on the left bank of the Irawadi, in Upper Burma, and is preserved in the Museum of the Geological Society. It is noticed by Clift in the Trans. Geol. Soc. ser. 2, vol. ii. pt. 3, p. 368, and is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxxi. figs. 2, 2 *a*. Together with the other specimens described by Clift, it forms the type of the species.

Mantell Collection. Purchased, 1836.

M. 2891. (*Fig.*) Fragment of the left half of the palate, containing the last three ridges of the well-worn m. 1, and the first three of the little-worn m. 2; from the Pliocene of the Siwalik Hills. Figured by Falconer and Cautley, *op. cit.* pl. xxxi. figs. 4, 4 *a*; and noticed by the present writer, *op. cit.* vol. iii. p. xviii, as a variety approaching *M. cautleyi*.

Presented by Dr. Hugh Falconer.

40678. The palate, containing the half-worn m. 2 of both sides; from the Siwaliks of Perim Island, Gulf of Cambay. The teeth are of very large size, and agree closely with the Burmese specimen figured by the present writer, *op. cit.* vol. i. pl. xxxviii. fig. 2. *Purchased*, 1867.

M. 2888–9. (*Fig.*) Cast of the right half of the palate of a small individual, containing the well-worn m. 2 and the little-worn m. 3, together with the inner half of the original specimen, which has been bisected in a vertical and longitudinal plane. Collected by Crawfurd near Yenankhoung, and figured by Clift in the Trans. Geol. Soc. ser. 2, vol. ii. pt. 3, pl. xxxvii. fig. 1, and by Falconer and Cautley, *op. cit.* pl. iii. fig. 8 (in section), and pl. xxxi. figs. 3, 3 *a*[1]. See also 'Falconer's Palæontological Memoirs,' vol. i. p. 83, pl. vi. fig. 2.

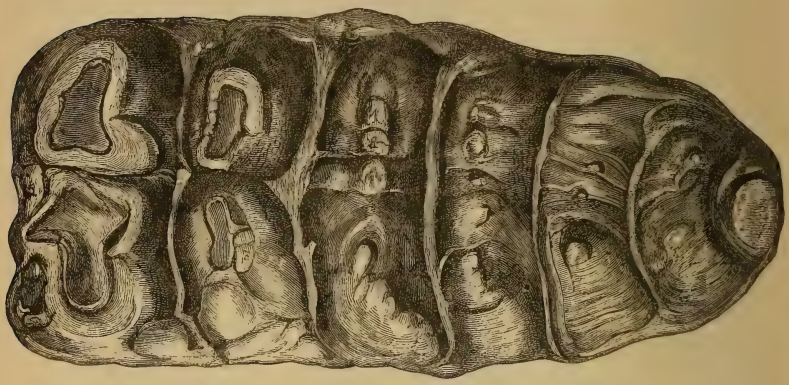
The original was presented by the Geological Society, in whose Museum the other half is preserved.

M. 2498. Cast of a third left upper true molar agreeing in size with m. 3 of the last specimen. The original was obtained in 1885 from the Pliocene (?) of Bruni, north-west Borneo; and is described and figured by the present writer in the

[1] In the description of the plate the teeth are described as mm. 4 and m. 1.; a determination followed by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. p. 232.

Proc. Zool. Soc. for 1885, p. 777, pl. xlviii., and in the 'Palæontologia Indica,' ser. 10, vol. iii. p. xvi, fig. 7, the latter figure being reproduced in the accompanying woodcut (fig. 19). *Made in the Museum*, 1885.

Fig. 19.



Mastodon latidens.—The third left upper true molar of a small individual in a partially-worn condition; from the Pliocene (?) of Borneo. $\frac{2}{3}$. The lower border of the figure is the inner border of the specimen. (From the 'Palæontologia Indica.')

37253. A very similar specimen of a third left upper true molar, in a rather more worn condition; from Perim Island. The valleys are rather less open, and the specimen thereby agrees very closely with No. M. 2817 of *M. cautleyi*, and thus indicates how the two forms shade into one another[1]. ? *Presented by Walter Ewer, Esq.*

7391. Cast of the first two ridges of the third left upper true molar of a large individual. The original was collected by Crawfurd near Yenankhoung; and is figured by Clift, *op. cit.* pl. xxxvii. fig. 4, and by Falconer and Cautley, *op. cit.* pl. xxxi. figs. 5, 5 *a*. It agrees very closely with the corresponding part of the complete specimen figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xxxix. *Mantell Collection. Purchased*, 1836.

M. 3426. Cast of the third left upper true molar. The original was obtained from the Siwaliks of Lehri, Punjab, and is preserved in the Indian Museum (No. A 81); it is but

[1] If this specimen really belongs to *M. cautleyi* it would indicate a small race of that form, and thus suggest that some of the "intermediate" molars of the latter may be one step higher in the series.

slightly worn, and shows five ridges and a double hind talon. A small quantity of cement is present in the valleys, and the specimen agrees very closely with the equally large example figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xxxix.

Made in the Museum, 1886.

7537. Fragment of a much-worn third upper true molar; from near Yenankhoung. *Mantell Collection. Purchased*, 1836.

M. 2890. The much-worn first ridge of the third right upper true molar; from near Yenankhoung.

Presented by Gen. Hardwicke.

As mentioned above, the lower molars of the species cannot be satisfactorily distinguished from those of M. cautleyi, *so that the reference of these teeth mainly depends on locality.*

M. 3423. Cast of the well-worn fourth right lower milk-molar, wanting the first ridge. The original is from the Punjab, and is preserved in the Indian Museum, Calcutta (No. A 66); it is figured by the present writer, *op. cit.* vol. i. pl. xxxvii. fig. 2, as the complete penultimate milk-molar. *Made in the Museum*, 1886.

M. 3425. Cast of the first right lower true molar, in a well-worn condition. The original probably came from Yenankhoung, and is preserved in the Indian Museum (No. A 77); it is figured by the present writer, *op. cit.* vol. i. pl. xxxvii. fig. 1, as $\overline{\text{mm. 4}}$. *Made in the Museum*, 1886.

7394. Cast of part of the right ramus of the mandible, containing the half-worn $\overline{\text{m. 3}}$. The original was obtained by Crawfurd near Yenankhoung, and is preserved in the Museum of the Geological Society; it is figured by Clift, *op. cit.* pl. xxxviii. fig. 1, and by Falconer and Cautley, *op. cit.* pl. xxx. figs. 6, 6 *a*.

Mantell Collection. Purchased, 1836.

14762. (*Fig.*) The last three ridges and talon of the third right lower true molar, in a well-worn condition; from Burma. Figured by Falconer and Cautley, *op. cit.* pl. xxxi. figs. 8, 8 *a*.

Presented by Col. Burney. Before 1846.

14764. (*Fig.*) Hinder portion of the second left lower true molar; in a well-worn condition; from Burma. Figured by Falconer and Cautley, *op. cit.* pl. xxxi. figs. 7, 7 *a*.

Presented by Col. Burney. Before 1846.

M. 2892. An imperfect first or second lower true molar, in a well-worn condition; from Burma.

Presented by Col. Burney.

The following specimen may perhaps belong to this species.

M. 2886. (*Fig.*) The germ of a tooth which appears to be a third left lower premolar; from the Siwalik Hills. Figured by Falconer and Cautley, *op. cit.* pl. xl. figs. 1, 1 *a*, as penultimate upper milk-molar. *Cautley Collection. Presented*, 1842.

The following specimen is not specifically determined.

46922. A much-worn (fourth?) right upper milk-molar, with three ridges and a large hind talon; from the Red Crag of Woodbridge, Suffolk. *Purchased*, 1875.

Genus **ELEPHAS**, Linn.[1]

Including *Stegodon*, *Loxodon*, and *Euelephas*, Falconer[2].

Dentition:—Usually I. $\frac{1}{0}$, C. $\frac{0}{0}$, Mm. $\frac{3}{3}$, M. $\frac{3}{3}$. The upper incisors (which are preceded by milk-teeth) are usually large, and are devoid of enamel except on the unworn apex. Lower incisors are apparently always absent, and premolars are known in only two species; the mandibular symphysis is always short, and frequently terminates in a deflected spout-like channel. The ridges of the cheek-teeth are always entire, and there is usually no trace of a median longitudinal cleft on their crowns; cement is always present in the valleys, but its amount, as well as the relative height of the ridges, varies greatly in different species. The number of ridges in the "intermediate" molars appears to be never less than five, and, except in some of the more generalized forms, is not isomerous throughout the series; the number of ridges in m. 3 is never less than seven, and may reach to twenty-four. The plane of wear of the crowns of the teeth of all the species except *E. clifti* is either nearly horizontal, or the inner side of the upper teeth and the outer side of the lower is the higher. There are never more than one or portions of two cheek-teeth in use at any one time; and all the teeth succeed one another in the arc of a circle. The cranium is more vaulted than is usually the case in *Mastodon*.

[1] Syst. Nat. ed. 12, vol. i. p. 48 (1766).

[2] Quart. Journ. Geol. Soc. vol. xiii. p. 318 (1857). Originally described as subgenera, but ranked as genera by many later writers. The name *Loxodon* is preoccupied by a genus of Sharks.

There is no character by which the present genus can be distinguished from *Mastodon*; and the division can therefore only be regarded as a matter of convenience.

A. *Stegodont Group.*

The ridge-formula of the cheek-teeth of the group embraces the following range, viz. :—Mm. $\frac{2.(4–5).(5–7)}{2.(4–5).(5–7)}$; M. $\frac{(6–8).(6–8).(7–11)}{(6?–7).(6?–12).(7–13)}$.

The ridges are comparatively low, broad, and tectiform, and the valleys may be only partially filled with cement. The summits of the unworn ridges are capped by numerous mammillæ; and the crowns of the teeth may retain traces of the median longitudinal cleft. The transition effected by *E. clifti* to *Mastodon latidens* is so complete as to indicate that there is no real distinction between the two genera [1]. In all those members of the group in which the cranium is known, the vertex is relatively low, and the length from the nasal aperture to the vertex is consequently comparatively short, and the incisions of the temporal fossa on to the frontals are comparatively small; in both of which respects the group agrees much more nearly with *E. africanus* than with *E. indicus* [2].

Elephas clifti, Falconer and Cautley[3].

Syn. *Mastodon elephantoides,* Clift [4]. Elephas clifti Clift Trans. Geol. Soc. ser. 2, vol. iii. 1829. p. 194
Stegodon sinensis, Owen [5].
Stegodon clifti, Naumann [6].

This species is still very imperfectly known; the ridge-formula may be approximately given as Mm. $\frac{?.4.5}{?.?.?}$; M. $\frac{(6–7).6.(7–8)}{?.?.(7–8)}$. The ridges are low, and there is usually a more or less distinct trace of the median longitudinal cleft on the crowns of the cheek-teeth, in which the plane of wear is the same as in *Mastodon*. The valleys of the teeth contain only a small quantity of cement, the enamel is vertically grooved, and usually thinner than in *Mastodon latidens*, while the number of cusps on the ridges is more numerous than in that species. Premolars are present in one specimen provisionally referred to this species; and the mandibular symphysis was probably

[1] Pohlig ('Sitz. niederrhein. Ges.' Feb. 4th, 1884) proposes to revert to Clift's view and class the Stegodont Elephants with *Mastodon*.
[2] Compare 'Fauna Antiqua Sivalensis,' pl. xlii.
[3] Fauna Antiqua Sivalensis, pt. 1, p. 47 (1846).
[4] Trans. Geol. Soc. ser. 2, vol. ii. pt. 3, p. 372 (1828).
[5] Quart. Journ. Geol. Soc. vol. xxvi. p. 417 (1870).
[6] Palæontographica, vol. xxviii. art. 1, p. 9 (1881).

short and edentulous. Those molars in which the median cleft is most marked approximate very closely to certain examples of those of *M. latidens*, of which the present species may be regarded as the descendant [1].

Hab. India (Siwalik Hills and Punjab), Burma, China [2], and Japan [3].

41925. (*Fig.*) A third right upper milk-molar, provisionally referred to this species; from the Pliocene near Shanghai, China. This specimen is the type of *Stegodon sinensis*, and is described and figured under that name by Owen in the Quart. Journ. Geol. Soc. vol. xxvi. p. 417, pl. xxvii.; it is also figured and provisionally referred to the present species by the writer, in the 'Palæontologia Indica,' ser. 10, vol. i. p. 257, pl. xlv. fig. 2. There are four complete ridges, and a large anterior talon, which is reckoned by Owen as a fifth ridge. The median longitudinal cleft is very indistinct.

Presented by Prof. Sir R. Owen, K.C.B., 1870.

M. 3421–2. Cast of the fourth left upper milk-molar in a fragment of the maxilla, together with that of the germ of pm. 4 which was imbedded in the maxilla, provisionally referred to this species. The originals were obtained from the Siwaliks of Asnot, Punjab, and are preserved in the Indian Museum (No. A 64); they are figured by the present writer, *op. cit.* pl. xxxvii. figs. 6, 8, as *Mastodon latidens*. The milk-molar agrees, however, precisely with the teeth of the next specimen (which was referred by Falconer to the present species) [4]; it differs from the teeth of *M. latidens* in the deep grooving of the enamel, and the greater number of cusps on the ridges; the latter are five in number, the fifth being smaller than the others [5]. There is a slight median cleft on the fourth ridge, which is wanting in No. 7388. *Made in the Museum*, 1886.

[1] *M. latidens* occurs in the Lower Siwaliks of Sind, where *E. clifti* is unknown.

[2] On the assumption that *S. sinensis* belongs to this species.

[3] Naumann, 'Palæontographica,' vol. xxviii. art. 1, pls. i. & ii.

[4] The tooth figured in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xlv. fig. 1 as mm. 4 is probably m. 1; its ridges may be reckoned as seven, and it agrees in general characters with mm. 4 of the present specimen.

[5] When referring this tooth to *M. latidens* the fifth ridge was reckoned as a large talon.

14760. Portion of the palate showing the much-worn mm. 4 and the (*Fig.*) first three ridges of the half-worn m. 1, provisionally referred to this species; from the Pliocene Siwaliks of Upper Burma. This specimen evidently belongs to the same species as the last. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxx. figs. 1, 1*a*. A distinct trace of the median longitudinal cleft remains in m. 1, which agrees precisely in this respect, in the grooving of the enamel, and the large number of cusps with the preceding specimens. Both this and the last specimen approximate very closely to certain molars of *Mastodon latidens* ('Palæontologia Indica,' ser. 10, vol. i. pl. xxxviii.). *Presented by Col. Burney. Before* 1846.

7388. Cast of the first (?) left upper true molar in an early stage of wear (woodcut, fig. 20). The original was obtained

Fig. 20.

Elephas clifti.—The first (?) left upper true molar; from the Siwaliks of Burma. ½. The lower border of the figure is the inner border of the specimen. (From Gaudry's 'Enchaînements.')

near Yenankhoung, on the left bank of the Irawadi in Upper Burma, by Crawfurd in 1826, and is preserved in the Museum of the Geological Society; it is one of the types of the species, and is figured by Clift in the Trans. Geol. Soc. ser. 2, vol. ii. pt. 3, pl. xxxix. fig. 6, under the name of *M. elephantoides*; it is also figured by Falconer and Cautley, *op. cit.* pl. xxx. figs. 2, 2*a*. See also 'Falconer's

Palæontological Memoirs,' vol. i. p. 82. There is scarcely any trace of the median cleft, the cement is slight, and there are numerous cusps.

Mantell Collection. Purchased, 1836.

39710. The second right upper true molar, in a somewhat more worn condition; from the Pliocene of the Siwalik Hills. The specimen apparently has six ridges and talons.

Cautley Collection. Presented, 1842.

M. 3494, 7389. (*Fig.*) One half of the anterior part of a vertically and longitudinally bisected third (?) right upper true molar, together with a cast of the complete specimen. The specimen was collected by Crawfurd near Yenankhoung, and is figured by Falconer and Cautley, *op. cit.* pl. xxx. figs. 4, 4 *a*, 4 *b* (as m. 2). *The original was presented by the Geological Society; the cast belongs to the Mantell Collection, Purchased*, 1836.

14759. (*Fig.*) The third left lower true molar; from Burma. This specimen shows eight ridges and a hind talon; and is figured by Falconer and Cautley, *op. cit.* pl. xxx. figs. 5, 5 *a* (as of the left side).

Presented by Col. Burney. Before 1846.

Elephas bombifrons, Falconer and Cautley[1].

Syn. *Stegodon bombifrons*, auct.

The ridge-formula of this species may be approximately given as Mm. $\frac{?.?.(5\text{–}6)}{?.4.(5\text{–}7)}$, M. $\frac{6.(6\text{–}7).(8\text{–}9)}{7.(7\text{–}8).(8\text{–}9)}$. The ridges are rather taller, somewhat wider apart, and more numerous than in *E. clifti*, and the valleys are generally completely filled with cement; it is, however, sometimes very difficult to distinguish between the hinder teeth of the two species, while in the opposite direction it is often difficult to distinguish between those of *E. bombifrons* and *E. insignis*. The teeth figured by Falconer and Cautley under the name of *E. ganesa* cannot be distinguished from those of the present species, and are therefore provisionally classed under the same head. The teeth are frequently very large, and the ridges are often curved; a trace of the median longitudinal cleft can often be observed in the first two or three ridges, and the inner columns of these ridges occasionally show accessory tubercles near the longitudinal cleft, where they assume a *Mastodon*-like shape. The plane of wear of the teeth of

[1] Fauna Antiqua Sivalensis, pt. 1, p. 46 (1846).

this and the following species is similar to that of the true Elephants. The mandibular symphysis is produced into a spout-like termination, as in *E. indicus*. The cranium has the fronto-parietal region very convex, the constriction of the frontals by the temporal fossæ being more marked than in the other species.

Hab. India (Punjab to Siwalik Hills) and (?) China[1]. The species may perhaps also occur in Java. All the following specimens are from the Pliocene of the Siwalik Hills.

M. 2978. (*Fig.*) The cranium, showing the third true molars of both sides in an early stage of wear. This specimen is the type, and is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xxvi.

Cautley Collection. Presented, 1842.

M. 2979. (*Fig.*) The cranium, showing the third true molar in a half-worn condition. Figured by Falconer and Cautley, *op. cit.* pl. xxvii., and pl. xxviii. figs. 1–4. There are eight or nine ridges in the molar.

Cautley Collection. Presented, 1842.

M. 2980. (*Fig.*) Middle portion of the cranium, showing the partially-worn third true molar, which appears to have eight ridges. Figured by Falconer and Cautley, *op. cit.* pl. xxix. fig. 1.

Cautley Collection. Presented, 1842.

M. 2981. (*Fig.*) Occipital segment of the cranium. Figured by Falconer and Cautley, *op. cit.* pl. xxviii. fig. 5.

Cautley Collection. Presented, 1842.

M. 2982. (*Fig.*) Middle portion of the cranium, showing the half-worn third true molar, which has eight ridges. Figured by Falconer and Cautley, *op. cit.* pl. xxix. figs. 2, 2 *a*.

Cautley Collection. Presented, 1842.

36682. An imperfect cranium provisionally referred to this species, containing the partially-worn m. 3 of either side. The teeth carry eight ridges and a talon.

Presented by the Secretary of State for India, 1860.

36683. (*Fig.*) The palate, showing part of m. 2 and the complete m. 3. Figured by Falconer and Cautley, *op. cit.* pl. xxiv A. figs. 1, 1 *a* (as *E. ganesa*). There are eight ridges in m. 3, which cannot be distinguished from the preceding specimens.

Presented by the Secretary of State for India, 1860.

[1] Koken, Pal. Abhand. vol. iii. pt. 2, p. 12 (1885).

18489. Portion of a palate, showing the third true molar on either (*Fig.*) side, of which the left one has been longitudinally and vertically bisected. The molar, which appears to have eight ridges, is figured in section by Falconer and Cautley, *op. cit.* pl. iii. fig. 7 *a* (as *E. ganesa*), and also in 'Falconer's Palæontological Memoirs,' vol. i. pl. vi. fig. 1.

Cautley Collection. Presented, 1842.

M. 3029. Part of the cranium, showing m. 2 and m. 3. Figured by (*Fig.*) Falconer and Cautley, *op. cit.* pl. xix. A. figs. 5, 5 *a* (as *E. insignis*). There are six ridges in m. 2 and nine in m. 3.

Cautley Collection. Presented, 1842.

M. 2983. Fragment of the palate, showing part of the right m. 3. (*Fig.*) The tooth is figured by Falconer and Cautley, *op. cit.* pl. xxiv. figs. 5, 5 *a* (as *E. ganesa*).

Cautley Collection. Presented, 1842.

M. 2984. The right half of the palate, containing part of m. 1 and (*Fig.*) the complete unworn m. 2. Figured by Falconer and Cautley, *op. cit.* pl. xxiv. figs. 3, 3*a* (as *E. ganesa*). There are seven ridges in the complete tooth, all of which are curved; and the first two show the median cleft and accessory tubercles in the valleys, so that their inner columns approach those of *Mastodon*.

Cautley Collection. Presented, 1842.

M. 2985. A smaller example of the second left upper true molar, in an early stage of wear. This specimen agrees very closely with m. 1 figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xlvi. fig. 1.

Cautley Collection. Presented, 1842.

M. 2986. A small specimen of a third upper true molar, containing nine ridges. *Cautley Collection. Presented*, 1842.

M. 2987. An imperfect third left upper true molar, with the two first ridges touched by wear.

Transferred from the Old Indian Museum, 1880.

M. 2988. An imperfect and partially worn third left upper true molar of large size, apparently containing eight ridges.

Cautley Collection. Presented, 1842.

M. 2989. A half-worn specimen of the third right upper true molar, (*Fig.*) containing eight ridges. Figured by Falconer and Cautley, *op. cit.* pl. xxiv. figs. 4, 4 *a* (as *E. ganesa*).

Presented by Dr. Hugh Falconer.

M. 2990. (*Fig.*) The almost unworn third right upper true molar, imperfect posteriorly. Figured by Falconer and Cautley, *op. cit.* pl. xxix. figs. 4, 4 *a*. Eight ridges remain, and cement is abundant. *Cautley Collection. Presented*, 1842.

16610. The first four ridges of the third left upper true molar. *Cautley Collection. Presented*, 1842.

M. 1994. A third upper true molar, vertically and longitudinally bisected, and containing eight ridges. *Cautley Collection. Presented*, 1842.

36737. The third right upper true molar, vertically and longitudinally bisected, and containing nine ridges. *Presented by the Secretary of State for India*, 1860.

36689. (*Fig.*) The symphysis and part of the rami of the mandible, showing $\overline{\text{m. 2}}$ of both sides. The teeth are half-worn and contain seven ridges each. Figured by Falconer and Cautley, *op. cit.* pl. xxix. A. fig. 4. *Presented by the Secretary of State for India*, 1860.

16201. (*Fig.*) The greater part of the mandible showing the imperfect $\overline{\text{m. 3}}$ of either side. Figured by Falconer and Cautley, *op. cit.* pl. xxv. figs. 2, 2 *a*. *Cautley Collection. Presented*, 1842.

M. 2991. (*Fig.*) The greater portion of the mandible, showing the third true molar of either side, which has nine ridges. Figured by Falconer and Cautley, *op. cit.* pl. xxv. figs. 3, 3 *a*. *Cautley Collection. Presented*, 1842.

36692. The symphysis and portions of the rami of the mandible of a small individual, showing the greater part of the well-worn $\overline{\text{m. 3}}$. *Presented by the Secretary of State for India*, 1860.

M. 2992. (*Fig.*) The greater part of the mandible, showing the well-worn $\overline{\text{m. 3}}$ of either side, which apparently had eight ridges. Figured by Falconer and Cautley, *op. cit.* pl. xxv. figs. 1, 1 *a* (as *E. ganesa*). *Cautley Collection. Presented*, 1842.

M. 2993. (*Fig.*) Part of the mandible, containing part of $\overline{\text{m. 1}}$, and the broken base of $\overline{\text{m. 2}}$, which appears to have had eight ridges. Figured by Falconer and Cautley, *op. cit.* pl. xx. A. figs. 1, 1 *a* (as *E. ganesa*). *Cautley Collection. Presented*, 1842.

M. 2994. (*Fig.*) Considerable portion of the mandible, showing the greater part of the right m. 3, and a fragment of the corresponding left tooth. Figured by Falconer and Cautley, *op. cit.* pl. xxv. A. figs. 2, 2 *a*.

Cautley Collection. Presented, 1842.

M. 2995. (*Fig.*) Part of the right ramus of the mandible, containing the imperfect mm. 4. Figured by Falconer and Cautley, *op. cit.* pl. xxix. A. figs. 1, 1 *a*.

Presented by Gen. Sir W. E. Baker, K.C.B., 1848.

M. 2996. Part of the right ramus of mandible, containing the half-worn mm. 4, which has seven ridges, and differs from mm. 4 of *E. insignis* by becoming narrower anteriorly.

Presented by the Secretary of State for India, 1860.

18462. (*Fig.*) Part of the right ramus of the mandible, containing the complete m. 1 (which has seven ridges) and m. 2 *in alveolo*. Figured by Falconer and Cautley, *op. cit.* pl. xxix. B. figs. 6, 6 *a*. *Cautley Collection. Presented*, 1842.

M. 2997. (*Fig.*) The greater part of the right ramus of the mandible of a small individual, containing the hinder portion of mm. 4, the complete m. 1 (with seven ridges), and the germ of m. 2. Figured by Falconer and Cautley, *op. cit.* pl. xxv. A. figs. 4, 4 *a* (as *E. ganesa*). Except in its smaller size m. 1 agrees very closely with the corresponding tooth of No. 18462, and differs from that of *E. insignis* by being narrower anteriorly than posteriorly, as well as by the form of its ridges. *Cautley Collection. Presented*, 1842.

36691. (*Fig.*) Part of the right ramus of the mandible, containing the partially-worn m. 1, which has seven ridges. Figured by Falconer and Cautley, *op. cit.* pl. xxix. A. figs. 2, 2 *a*.

Presented by the Secretary of State for India, 1860.

M. 2998. (*Fig.*) Fragment of the left ramus of the mandible, containing two imperfect teeth (the second being *in alveolo*), which are apparently m. 1 and m. 2. Figured by Falconer and Cautley, *op. cit.* pl. xxix. A. figs. 7, 7 *a*.

Cautley Collection. Presented, 1842.

M. 3000. Fragment of the right ramus of the mandible, containing the half-worn m. 2, which has seven ridges and a large hind talon. *Cautley Collection. Presented*, 1842.

36690. Part of the left ramus of the mandible, containing the
(*Fig.*) partially-worn $\overline{\text{m. 2}}$. Figured by Falconer and Cautley, *op. cit.* pl. xxix. A. figs. 3, 3 *a*. Except that the enamel is rather less plicated, the tooth cannot be distinguished from the last specimen, which Falconer referred to *E. ganesa*.
Presented by the Secretary of State for India, 1860.

M. 3002. Part of the left ramus of the mandible, containing the
(*Fig.*) imperfect $\overline{\text{m. 2}}$, which has seven ridges. Figured by Falconer and Cautley, *op. cit.* pl. xx. A. figs. 2, 2 *a* (as *E. ganesa*). *Cautley Collection. Presented*, 1842.

M. 3001. The third left lower true molar, in an early stage of
(*Fig.*) wear. Figured by Falconer and Cautley, *op. cit.* pl. xxix. B. figs. 7, 7 *a*; there are nine ridges and a talon, the first ridge being bifurcate externally.
Presented by Dr. Hugh Falconer.

M. 3003. Hinder part of the left ramus of the mandible, containing
(*Fig.*) the last five ridges of the third true molar. Figured by Falconer and Cautley, *op. cit.* pl. xxv. A. figs. 5, 5 *a* (as *E. ganesa*). *Cautley Collection. Presented*, 1842.

M. 3004. Hinder part of the left ramus of the mandible, containing
(*Fig.*) the imperfect $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xxv. A. figs. 7, 7 *a* (as *E. ganesa*).
Cautley Collection. Presented, 1842.

M. 3005. Fragment of the right ramus of the mandible, containing
(*Fig.*) the imperfect $\overline{\text{m. 3}}$, which apparently carried eight ridges. Figured by Falconer and Cautley, *op. cit.* pl. xxv. A. figs. 1, 1 *a* (as *E. ganesa*).
Cautley Collection. Presented, 1842.

M. 3006. Hinder half of a well-worn third right lower true molar,
(*Fig.*) provisionally referred to this species. Figured by Falconer and Cautley, *op. cit.* pl. xxix. fig. 5.
Cautley Collection. Presented, 1842.

M. 2999. Longitudinal and vertical section of part of the right
(*Fig.*) ramus of the mandible, containing the little-worn $\overline{\text{m. 2}}$, which has seven ridges. Figured by Falconer and Cautley, *op. cit.* pl. iii. fig. 7 *b* (as *E. ganesa*). The specific reference of this specimen is provisional.
Cautley Collection. Presented, 1842.

M. 1995. Part of the right ramus of a mandible containing $\overline{\text{m. 2}}$,
(*Fig.*) which has been vertically and longitudinally bisected.

Figured by Falconer and Cautley, *op. cit.* pl. XXV A. figs. 3, 3 *a* (as *E. ganesa*). The tooth apparently has seven ridges.
Transferred from the Old Indian Museum, 1880.

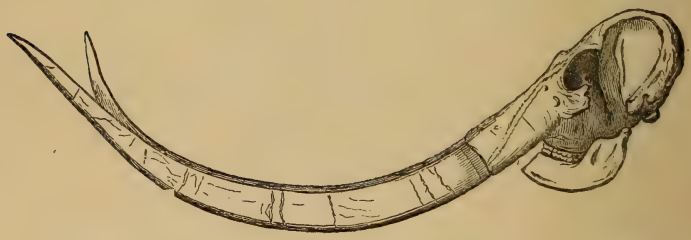
M. 1993. Fragment of the right ramus of a mandible containing the half-worn $\overline{m.\ 3}$, which has been longitudinally and vertically bisected. The tooth appears to have had eight ridges.
Presented by Dr. Hugh Falconer.

Elephas ganesa, Falconer and Cautley [1].

Syn. *Stegodon ganesa*, auct.

The third true molars in the type cranium of this species contain ten ridges, and thereby agree with the corresponding teeth of *E. insignis* rather than of *E. bombifrons*, a conclusion confirmed by a second cranium, in which there appear to be either ten or eleven ridges in the same tooth [2]. This close resemblance between the last molar of this form and of *E. insignis* renders it apparently impossible to draw any distinction between the earlier teeth of the two forms [3], and all such teeth are therefore referred to the latter. Falconer [4] had considerable doubts as to the specific distinctness of the present

Fig. 21.



Elephas ganesa.—The skull; from the Siwalik Hills. $\frac{1}{32}$. (After Gaudry's 'Enchaînements.')

form, and as the resemblance between the type cranium and the young cranium of *E. insignis* [5] indicates that the two are closely related, it is possible that *E. ganesa* may be the male form of *E. insignis*. The adult cranium does not differ very widely from the type of *E. indicus*, although the frontal constriction is less marked.

[1] Fauna Antiqua Sivalensis, pt. i. p. 45 (1846).

[2] See Rec. Geol. Surv. Ind. vol. ix. p. 48 (1876).

[3] The majority of the teeth figured in the 'Fauna Antiqua Sivalensis' under the name of *E. ganesa* have the low ridge-formula of *E. bombifrons* (*q. v.*).

[4] See 'Palæontological Memoirs,' vol. ii. p. 84.

[5] See Fauna Antiqua Sivalensis,' pl. xliii. figs. 14, 15.

Hab. India (Pliocene of the Punjab and Siwalik Hills, and Pleistocene of the Narbada Valley [1]).

M. 3008. (*Fig.*) The imperfect cranium, showing the partially-worn third true molar of either side, the base of the left and the greater portion of the right incisor; from the Pliocene of the Siwalik Hills. This specimen (the missing portions of which have been restored in wood) is the type, and is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pls. xxi., xxii., xxiii., and xliii. fig. 14. It is remarkable for the enormous size of the incisors.

Presented by Gen. Sir W. E. Baker, K.C.B., 1848.

Elephas insignis, Falconer and Cautley [2].

Syn. *Mastodon elephantoides,* Clift [3] (*in parte*).
(?) *Stegodon orientalis,* Owen [4].
Stegodon insignis, Naumann [5].

The apparent impossibility of distinguishing the dentition of this species from that of *E. ganesa* has been already mentioned. The ridge-formula [6] may be approximately given as Mm. $\frac{2.(5\text{–}6).7}{2.5.(7\text{–}9)}$, M. $\frac{(7\text{–}8).(7\text{–}8).(9\text{–}11)}{(7\text{–}10).(8\text{–}12).(9\text{–}13)}$. The ridges of the cheek-teeth are usually rather taller and narrower than in *E. bombifrons*, their average number greater, and the cement still more abundant. It is, however, not always easy to distinguish between the two. The third molar is usually narrower posteriorly, and the enamel frequently thinner. The taller and more numerous ridges indicate that the present species is intermediate in respect of dental characters between *E. bombifrons* and *E. planifrons*. The adult cranium is remarkable for the great depression of the fronto-parietal region, although this feature is less marked in some specimens than in others [7]; but in the young cranium the contour is indistinguishable from that of the adult *E. ganesa* [8].

[1] See 'Palæontologia Indica,' ser. 10, vol. i. p. 274.

[2] Fauna Antiqua Sivalensis, pt. 1, p. 37 (1846).

[3] Trans. Geol. Soc. ser. 2, vol. ii. pt. 3, p. 372 (1828).

[4] Quart. Journ. Geol. Soc. vol. xxvi. p. 421 (1870).

[5] Palæontographica, vol. xxviii. art. 1, p. 12 (1881).

[6] The formula given by Falconer (Pal. Mem. vol. ii. p. 86) is lower, and evidently incorrect; a modification was given by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. p. 273, but owing to Falconer's errors this was also incorrect, as it included one specimen of *E. bombifrons*.

[7] Compare 'Fauna Antiqua Sivalensis,' pl. xliii. figs. 15, 15 *b*.

[8] It is of course self-evident that these young crania (like detached teeth) might equally well have belonged to *E. ganesa*.

Hab. India (Pliocene of the Punjab and Siwalik Hills, and probably the Pleistocene of the Narbada Valley[1]), Burma, China[2], (?) Java[3], and Japan[4]. Unless otherwise stated, the following specimens were obtained from the Siwalik Hills.

M. 3007. (*Fig.*) The imperfect cranium. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xvi. fig. 1. This and the following specimens are the types of the species. *Cautley Collection. Presented*, 1842.

M. 3009. (*Fig.*) The imperfect cranium, showing the last true molars of either side. Figured by Falconer and Cautley, *op. cit.* pl. xvi. figs. 2–4. The molars probably carried ten or eleven ridges. *Cautley Collection. Presented*, 1842.

36684. (*Fig.*) The imperfect cranium. Figured, from the occipital aspect, by Falconer and Cautley, *op. cit.* pl. xvi. fig. 3. *Presented by the Secretary of State for India*, 1860.

M. 3010. (*Fig.*) The imperfect cranium, showing the second true molars. Figured by Falconer and Cautley, *op. cit.* pl. xvii. figs. 1, 2, and pl. xliii. fig. 15 *b*; the depression of the fronto-parietal region is less strongly marked than in many specimens. *Presented by Dr. Hugh Falconer.*

36735. (*Fig.*) The nearly perfect cranium, showing the second and third true molars, the latter having eleven ridges. Figured by Falconer and Cautley, *op. cit.* pl. xvii. figs. 3, 4. *Presented by the Secretary of State for India*, 1860.

M. 3011. (*Fig.*) The imperfect cranium, showing part of m. 2 and the complete m. 3. Figured by Falconer and Cautley, *op. cit.* pl. xix. figs. 6, 6 *a*. The last molar has eleven ridges and a talon. *Cautley Collection. Presented*, 1842.

[1] See 'Palæontologia Indica,' ser. 10, vol. i. p. 274.

[2] Koken, Pal. Abhand. vol. iii. pt. 2, p. 14 (1885).

[3] Martin, Beitr. Geol. Ost-Asiens u. Austral. vol. iv. pt. 1 (1884). It is suggested that the specimens described may belong either to this species or to *E. bombifrons*.

[4] Naumann, *op. cit.* pls. iii.–v. It has been stated by Brauns (Zeitschr. deutsch. geol. Ges. vol. xxxv. art. 1, p. 21 [1883]) that these specimens belong to *E. meridionalis*; there can, however, be no question but that they are typical teeth of Stegodonts.

M. 3012. (*Fig.*) Part of a small cranium with m. 2 and m. 3. Figured by Falconer and Cautley, *op. cit.* pl. xix. A. figs. 2, 2 *a*. The first tooth has seven, and the second eleven ridges.

Cautley Collection. Presented, 1842.

M. 3013. (*Fig.*) The imperfect cranium, showing m. 2 and m. 3. Figured by Falconer and Cautley, *op. cit.* pl. xix. A. figs. 4, 4 *a*. There are eight ridges in m. 2 and ten in m. 3.

Cautley Collection. Presented, 1842.

M. 3386. The right half of the imperfect cranium, showing part of m. 2 and the nearly complete m. 3. The latter tooth is unworn and probably had nine ridges.

Cautley Collection. Presented, 1842.

Fig. 22.

Elephas insignis.—Vertical and longitudinal section of the third left upper true molar; from the Pliocene of the Siwalik Hills. ½.

M. 3014. (*Fig.*) Part of a small cranium, showing m. 1 and m. 2. Figured by Falconer and Cautley, *op. cit.* pl. xxiv. figs. 6, 6 *a*, 6 *b*. Each of the teeth has seven ridges (one talon of m. 2 being reckoned by Falconer as a ridge.)

Cautley Collection. Presented, 1842.

M. 3015. (*Fig.*) An imperfect cranium, showing the third true molar of either side. The left tooth (woodcut, fig. 22) has been longitudinally and vertically bisected, and is figured in section by Falconer and Cautley, *op. cit.* pl. ii. fig. 6 *a*, and also in 'Falconer's Palæontological Memoirs,' vol. i. pl. iv. fig. 1. It carries ten ridges and a talon; the ridges having the sharp form characteristic of the species, and the laminated cement being very abundant.

Cautley Collection. Presented, 1842.

M. 3016. A small immature cranium[1], containing m. 1 and m. 2 of (*Fig.*) both sides. Figured by Falconer and Cautley, *op. cit.* pl. xxiv. figs. 2, 2 *a*, 2 *b*. The last tooth contains seven ridges and a talon, while six ridges remain in the worn m. 1.
Cautley Collection. Presented, 1842.

36736. An immature cranium, containing mm. 4 and m. 1. Figured (*Fig.*) by Falconer and Cautley, *op. cit.* pl. xviii. fig. 3. There are seven ridges in m. 1.
Presented by the Secretary of State for India, 1860.

M. 3017. An imperfect young cranium, showing the three milk- (*Fig.*) molars of either side. The teeth of one side are figured by Falconer and Cautley, *op. cit.* pl. xix. figs. 1, 1 *a*, 2, 2 *a*. There are six ridges in mm. 3 and seven in mm. 4.
Cautley Collection. Presented, 1842.

M. 3018. A young cranium containing the milk-teeth, of which the (*Fig.*) crowns have been broken off. Figured by Falconer and Cautley, *op. cit.* pl. xviii. fig. 2.
Cautley Collection. Presented, 1842.

M. 3019. An imperfect young cranium, containing a fragment of (*Fig.*) mm. 3 and the complete mm. 4, the latter having been longitudinally and vertically bisected. The cranium is figured by Falconer and Cautley, *op. cit.* pl. xviii. fig. 1, and a section of mm. 4 (which has seven ridges) in pl. xix. fig. 3. *Cautley Collection. Presented*, 1842.

M. 3020. The slightly-worn third left upper milk-molar, wanting (*Fig.*) the anterior talon. Figured by Falconer and Cautley, *op. cit.* pl. xxix. figs. 3, 3 *a* (as *E. bombifrons*). There are five ridges, and the specimen is of relatively large size.
Cautley Collection. Presented, 1842.

M. 3021. The fourth left upper milk-molar, imperfect anteriorly.
Cautley Collection. Presented, 1842.

M. 3022. The fourth right upper milk-molar, imperfect anteriorly. Both this and the last specimen are of relatively large size. *Cautley Collection. Presented*, 1842.

M. 3023. Fragment of the left maxilla, containing the greater (*Fig.*) portions of mm. 4 and m. 1. Figured by Falconer and

[1] As already mentioned, it is quite probable that some of the immature crania referred to this species may belong to *E. ganesa*; the sharp ridges of their molars indicate that they probably do not belong to *E. bombifrons*.

Cautley, *op. cit.* pl. xix. A. fig. 1. The teeth are small, and there are seven ridges in m. 1.

Cautley Collection. Presented, 1842.

M. 3025. (*Fig.*) Part of the left maxilla, containing the greater portions of m. 1 and m. 2. Figured by Falconer and Cautley, *op. cit.* pl. xix. figs. 5, 5 *a*. *Cautley Collection. Presented*, 1842.

M. 3024. Part of the palate, containing the last four ridges of m. 2 and the first five of the unworn m. 3.

Cautley Collection. Presented, 1842.

M. 3026. Part of the right maxilla, containing the hinder portion of m. 2 and the complete m. 3, which has eleven ridges and a talon. *Cautley Collection. Presented*, 1842.

M. 3027. Part of the maxilla, containing the last six ridges of m. 2 and the complete m. 3, which has been vertically and longitudinally bisected. In this specimen, of which the specific reference is provisional, there are only nine ridges in m. 3, but the acuteness of these ridges is a character of *E. insignis* rather than of *E. bombifrons*.

Cautley Collection. Presented, 1842.

M. 3028. Fragment of the left maxilla longitudinally and vertically bisected, containing portions of m. 2 and m. 3.

Cautley Collection. Presented, 1842.

M. 3030. (*Fig.*) The symphysis and greater portion of the right ramus of the mandible, containing part of m. 2 and the complete m. 3, which has thirteen ridges and talons. Figured by Falconer and Cautley, *op. cit.* pl. xviii. fig. 4.

Cautley Collection. Presented, 1842.

M. 3031. (*Fig.*) The greater part of the mandible, containing m. 1 and part of m. 2. Figured by Falconer and Cautley, *op. cit.* pl. xxv. fig. 4. There are seven ridges in m. 1.

Cautley Collection. Presented, 1842.

40841. The greater part of the right ramus of the mandible, containing the imperfectly protruded m. 3, in which twelve ridges are visible. *Presented by C. Falconer, Esq.*, 1867.

M. 3032. (*Fig.*) The greater part of the mandible, containing m. 3 of either side. Figured by Falconer and Cautley, *op. cit.* pl. xviii. A. figs. 3, 3 *a*. There are twelve ridges in the molar.

Presented by Dr. Hugh Falconer.

M. 3033. (*Fig.*) The symphysis and part of the rami of a mandible containing portions of a molar, provisionally referred to this species. Figured by Falconer and Cautley, *op. cit.* pl. xx. A. figs. 4, 4 *a*. *Cautley Collection. Presented*, 1842.

M. 3034. (*Fig.*) Cast of the greater part of the right ramus of the mandible, containing the last five ridges of $\overline{\text{m. 2}}$ and the complete $\overline{\text{m. 3}}$, which is almost unworn and has twelve ridges. This specimen is figured by Falconer and Cautley, *op. cit.* pl. xxiv. A. figs. 3, 3 *a*, as containing $\overline{\text{m. 1}}$ and $\overline{\text{m. 2}}$; the original is in the Museum of the Royal College of Surgeons (No. 2534).

Presented by the Council of the Royal College of Surgeons.

7393. Cast of part of the left ramus of the mandible, showing the complete and almost unworn $\overline{\text{m. 3}}$, in which there are ten ridges. The original was obtained by Crawfurd in 1826 from the Pliocene Siwaliks of the Irawadi valley near Yenankhoung, Upper Burma, by whom it was presented to the Geological Society. It is described and figured by Clift in the Trans. Geol. Soc. ser. 2, vol. ii. pt. 3, p. 372, pl. xxxviii. fig. 2 (as *Mastodon elephantoides*); and by Falconer and Cautley, *op. cit.* pl. xx. figs. 9, 9 *a*, and pl. xx. A. fig. 6 (as $\overline{\text{m. 2}}$?)[1]. *Mantell Collection. Purchased*, 1836.

M. 3035. (*Fig.*) Part of the left ramus of the mandible, containing the imperfectly protruded $\overline{\text{m. 3}}$, in which there are eleven ridges. Figured by Falconer and Cautley, *op. cit.* pl. xx. figs. 8, 8 *a*. *Cautley Collection. Presented*, 1842.

36686. (*Fig.*) Part of the left ramus of the mandible, containing the first eight ridges of the little-worn $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xx. A. figs. 5, 5 *a*.

Presented by C. Falconer, Esq., 1867.

36685. Part of the left ramus of the mandible, containing the imperfect $\overline{\text{m. 3}}$ (?).

Presented by the Secretary of State for India, 1860.

M. 3036. (*Fig.*) Part of the left ramus of the mandible, containing the greater part of $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xviii. A. figs. 5, 5 *a*.

Cautley Collection. Presented, 1842.

[1] So quoted by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. p. 272.

M. 3037. (*Fig.*) The hinder part of the left ramus of a mandible belonging either to this species or to *E. bombifrons*, and showing the greater part of the well-worn $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xviii. figs. 5, 5 *a*.

Cautley Collection. Presented, 1842.

M. 3038. (*Fig.*) Fragment of the left ramus of the mandible, containing the unworn $\overline{\text{m. 3}}$, which has nine ridges and a talon. Figured by Falconer and Cautley, *op. cit.* pl. xx. figs. 6, 6 *a*; in the description of the plate the tooth is regarded (from its low ridge-formula) as $\overline{\text{m. 2}}$, but there seems little doubt that it is really $\overline{\text{m. 3}}$, while the height of the ridges indicates that it belongs to the present species.

Cautley Collection. Presented, 1842.

M. 3039. (*Fig.*) Fragment of a mandible containing a considerable portion of $\overline{\text{m. 3}}$. This specimen has been longitudinally and vertically bisected; and is figured by Falconer and Cautley, *op. cit.* pl. ii. fig. 6 *b*.

Cautley Collection. Presented, 1842.

M. 3040. A small example of the apparently third lower true molar, which has been vertically and longitudinally bisected, and apparently carried ten ridges.

Cautley Collection. Presented, 1842.

M. 3041. The greater part of the third right lower true molar.

Presented by Dr. Hugh Falconer.

M. 3042. (*Fig.*) Part of the right ramus of the mandible, showing the adjacent portions of $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xxix. B. figs. 8, 8 *a*.

Cautley Collection. Presented, 1842.

M. 3043. (*Fig.*) The symphysis and part of the right ramus of the mandible, containing portions of $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xviii. A. figs. 4, 4 *a*.

Cautley Collection. Presented, 1842.

M. 2015. Cast of the hinder two-thirds of the unworn right $\overline{\text{m. 2}}$. The original was obtained, during the journey of Count Bela Szechenyi, from the Pliocene (?) of Kansu, North-west China, and is noticed by the present writer in the 'Palæontologia Indica,' ser. 10, vol. ii. p. 289; it agrees exactly with $\overline{\text{m. 2}}$ of the preceding specimens.

Presented by R. Lydekker, Esq., 1884.

M. 3044. (*Fig.*) Fragment of a well-worn second or third lower (?) true molar, probably belonging either to this species or to *E. ganesa*; from the Pleistocene of the Narbada Valley, India. Figured by Falconer and Cautley, *op. cit.* pl. lvi. figs. 10, 10*a*. *Presented by C. Fraser, Esq.*, 1849.

M. 3045. (*Fig.*) Portion of a mandible containing a fragment of a molar, which is probably specifically identical with the preceding specimens; from the Narbada Valley. Figured by Falconer and Cautley, *op. cit.* pl. lvi. figs. 11, 11 *a*.
Presented by C. Fraser, Esq., 1849.

M. 3046. (*Fig.*) Part of a lower molar not improbably belonging to the same species as the preceding; from the Narbada Valley. Figured by Falconer and Cautley, *op. cit.* pl. lvi. fig. 14.
Presented by C. Fraser, Esq., 1849.

M. 3047. (*Fig.*) Fragment of the left ramus of the mandible, containing parts of $\overline{\text{m. 1}}$ and $\overline{\text{m. 2}}$. Figured by Falconer and Cautley, *op. cit.* pl. xx. A. figs. 7, 7*a*.
Presented by Gen. Sir W. E. Baker, K.C.B., 1848.

M. 3048. (*Fig.*) Hinder portion of the left ramus of the mandible, containing part of an "intermediate" molar. Figured by Falconer and Cautley, *op. cit.* pl. xviii. figs. 6, 6 *a*.
Cautley Collection. Presented, 1842.

M. 3049. (*Fig.*) The left first (?) lower true molar. This tooth, which is of a peculiarly elongated type, is figured by Falconer and Cautley, *op. cit.* pl. xx. figs. 4, 4 *a* (as $\overline{\text{m. 2}}$).
Cautley Collection. Presented, 1842.

M. 3050. (*Fig.*) Part of the left ramus of the mandible, containing the incomplete $\overline{\text{mm. 3}}$, $\overline{\text{mm. 4}}$, and $\overline{\text{m. 1}}$. Figured by Falconer and Cautley, *op. cit.* pl. xx. figs. 3, 3 *a*. There were nine ridges in $\overline{\text{mm. 4}}$. *Cautley Collection. Presented*, 1842.

M. 3052. (*Fig.*) Part of the right ramus of the mandible, showing part of $\overline{\text{mm. 3}}$ and the complete $\overline{\text{mm. 4}}$, which has nine ridges. Figured by Falconer and Cautley, *op. cit.* pl. xx. figs. 5, 5 *a*.
Presented by Dr. Hugh Falconer.

M. 3054. Part of the left ramus of the mandible, showing the greater part of the unworn $\overline{\text{mm. 4}}$.
Cautley Collection. Presented, 1842.

M. 3051. (*Fig.*) Fragment of the left ramus of the mandible, showing the germ of $\overline{\text{mm. 4}}$, which is imperfect posteriorly. Figured by Falconer and Cautley, *op. cit.* pl. xx. figs. 2, 2 *a*. Seven ridges remain in $\overline{\text{mm. 4}}$, which agrees very closely with a rather larger example figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xlvi. fig. 4[1]; which has only seven ridges.

Cautley Collection. Presented, 1842.

M. 3053. (*Fig.*) Fragment of the left ramus of the mandible, containing portions of $\overline{\text{mm. 3}}$ and $\overline{\text{mm. 4}}$. Figured by Falconer and Cautley, *op. cit.* pl. xx. figs. 1, 1*a*.

Presented by Dr. Hugh Falconer.

M. 3056. A well-worn third lower milk-molar, containing five ridges. *Cautley Collection. Presented*, 1842.

M. 3055. The greater portion of a half-worn third lower milk-molar. This specimen agrees very closely with one figured by the present writer in the 'Palæontologia Indica,' ser. 10, vol. i. pl. xlvi. fig. 2. *Cautley Collection. Presented*, 1842.

M. 3057. The anterior half of the unworn third left lower milk-molar. *Cautley Collection. Presented*, 1842.

41926–7. (*Fig.*) The last two ridges and talon of an unworn fourth lower milk-molar and portions of two other cheek-teeth, provisionally referred to the present species. These specimens, which were obtained from a cavern in Sechuen, north-west China, are the types of Owen's *Elephas* (*Stegodon*) *orientalis*, and are described and figured by him under that name in the Quart. Journ. Geol. Soc. vol. xxvi. pl. xxviii. figs. 1–4. They show, however, no characters by which they can be distinguished from the teeth of the present species, as the writer has already observed in the 'Palæontologia Indica,' ser. 10, vol. i. p. 269.

Purchased from R. Swinhoe, Esq., 1870.

[1] In the description of the plate the specimen is entered as $\overline{\text{m. 3}}$.

B. *Elephantine Group.*

Falconer's division of the more hypsodont Elephants into the loxodont and euelephantine groups has been found untenable [1], and as there are also objections to Pohlig's [2] proposed triple division into the archidiscodont, loxodont, and polydiscodont groups, the whole of the species are included in a single group.

In all the species of this group the ridges of the molars are so tall that they assume the appearance of plates, but there is great variation in respect to their height and number, those of the less specialized forms being not more numerous than in *Elephas insignis*. The cement always completely fills the interspaces between the ridges, and in the higher forms these interspaces are extremely narrow.

An almost complete transition in dental characters can be traced from the stegodont *E. insignis* through *E. planifrons* and *E. meridionalis* to *E. hysudricus*, whence there is a passage to *E. namadicus* and *E. antiquus*, and thence to *E. primigenius*, *E. indicus*, &c. One variety of *E. antiquus* shows, moreover, a molar structure so closely resembling that of *E. africanus* that a transition can be traced between these two species, and also between the former and the small Maltese species. Leith-Adams [3] indeed suggests that *E. hysudricus* gave rise to two branches, one comprising *E. namadicus*, *E. antiquus*, *E. africanus*, and the Maltese species, and the other *E. primigenius*, *E. indicus*, &c.; but the evidence is not sufficient to render this view by any means conclusive, and it has the objection of placing no intermediate form between *E. hysudricus* and the *E. primigenius* subgroup. It will be obvious from these remarks that it is impossible to exhibit the mutual relations of the various species in a linear arrangement.

Elephas planifrons, Falconer and Cautley [4].

Syn. *Loxodon planifrons*, auct.

The average ridge-formula [5], exclusive of talons, may be

[1] Thus the so-called *E. priscus* (which was subsequently identified with *E. antiquus*) was placed in the loxodont, while *E. antiquus* was classed in the euelephantine group.

[2] Sitz. niederrhein. Ges. Feb. 4th, 1884. The archidiscodont group includes *E. planifrons* and *E. meridionalis* (in which *E. hysudricus* is merged); the loxodont group *E. africanus* and (?) *E. antiquus* (with which the Maltese forms are identified); while the polydiscodont group comprises all the remaining species.

[3] History of British Fossil Elephants (Mon. Pal. Soc.), p. 244.

[4] 'Fauna Antiqua Sivalensis,' pt. 1, p. 38 (1846).

[5] This formula as well as the dental characters are somewhat modified from those given in the 'Palæontologia Indica,' ser. 10, vol. i. p. 275, where, owing to some misdeterminations in the 'Fauna Antiqua Sivalensis,' some of the ciphers are too high.

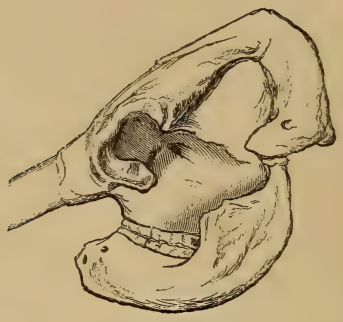
approximately represented as Mm. $\frac{3.(5\text{-}6).(6\text{-}7)}{3.\ 6\ .(7\text{-}8)}$, M. $\frac{7.(8\text{-}9).(10\text{-}12)}{7.(8\text{-}9).(10\text{-}13)}$; it is, however, not impossible that a larger series of specimens would probably show some variation in the number of ridges of the first true molar: certain specimens of $\overline{\text{m. 3}}$ referred to this species by Falconer have fourteen ridges, and approximate so closely to *E. hysudricus* that their specific reference is doubtful. The crowns of the molars are broad, the ridges are higher than in *E. insignis*, and the quantity of cement in the interspaces (woodcut, fig. 24, p. 102) is frequently very great; the enamel in the ridges of the true molars is usually thick, and frequently almost, or quite, devoid of plication, especially near the root of the crown; and when plication exists (as it frequently does, especially in the milk-molars) it is relatively coarse. The worn ridges present subellipsoidal disks, which have frequently an expansion in the middle, sometimes assuming an imperfect lozenge-shape; and in slightly worn teeth the middle portion of each ridge frequently forms an isolated disk; there is great variation in the relative breadth of the ridges as well as in the degree of their mesial expansion and the distance by which they are separated from one another; the relative width and the absolute size of the teeth also vary very considerably. Both the third and the fourth milk-molars were vertically succeeded by premolars. The cranium (woodcut, fig. 23, p. 100) is characterized by the flatness of the fronto-parietal region, the small incision of the temporal fossæ on the frontals, the comparatively slight vaulting of the vertex, the smallness of the nasal aperture and its approximation to the vertex, and the divergence of the incisive alveoli—the majority of these characters showing resemblance to the stegodont group and *E. africanus*. The mandible has two or three mentary foramina, and a small deflected spout-like termination to the symphysis. Some individuals were of enormous size.

The absence of premolars in *E. insignis* and *E. bombifrons* would seem to indicate that the present species is not a direct descendant of either of them. In cases where the ridges are narrower and taller than usual, it is sometimes very difficult to distinguish between the molars of this species and those of *E. hysudricus*; and the doubtful specimens of $\overline{\text{m. 3}}$ noticed on page 106 may indicate a form connecting the two species.

Hab. India (Siwalik Hills and Punjab). All the following specimens are from the Pliocene of the Siwalik Hills. The specifically undetermined specimen noticed on page 106 may indicate that the species survived into the Pleistocene of the Narbada Valley.

M. 3060. The imperfect cranium, showing the last true molar of (*Fig.*) either side. This specimen (woodcut, fig. 23) is the type,

Fig. 23.



Elephas planifrons.—Skull, restored; from the Pliocene of the Siwalik Hills. $\frac{1}{15}$.
(After Gaudry's 'Les Enchaînements' &c.)

and is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pls. ix., x. The left molar is well-worn while the right is untouched, from which it is inferred that the right m. 3 was absent; the teeth appear to have eleven ridges. *Cautley Collection. Presented*, 1842.

M. 3061. The imperfect cranium, showing the well-worn m. 2 and the unworn m. 3 of both sides. There are ten ridges in m. 3. *Cautley Collection. Presented*, 1842.

M. 3387. The imperfect cranium, showing m. 3 on either side. The teeth are about one third worn, and apparently contain twelve ridges. *Cautley Collection. Presented*, 1842.

M. 3062. The palate, showing the half-worn m. 3.
Cautley Collection. Presented, 1842.

15350. The palate of a small individual, showing m. 3 and part of m. 2; there are ten ridges in m. 3.
Cautley Collection. Presented, 1842.

M. 3063. The palate, containing the half-worn m. 2, in which there (*Fig.*) are eight ridges. Figured by Falconer and Cautley, *op. cit.* pl. xii. fig. 5 *a*. *Presented by W. Ewer, Esq.*

48930. The palate of an immature individual, showing the left pm. 3, (*Fig.*) and mm. 4 and m. 1 of both sides. Figured by Falconer and Cautley, *op. cit.* pl. vi. figs. 4–6. There are seven ridges in the unworn m. 1.

Presented by C. Falconer, Esq., 1867.

39691. Part of the left maxilla, showing the incomplete m. 1 and (*Fig.*) m. 2. Figured by Falconer and Cautley, *op. cit.* pl. xii. figs. 4, 4 *a*, 5.

Presented by the Secretary of State for India, 1860.

M. 3072. Part of the left maxilla or mandible, containing the greater (*Fig.*) part of the worn last true molar. Figured by Falconer and Cautley, *op. cit.* pl. xviii. A. figs. 1, 1*a*; this tooth is of enormous size, and has the ridges very far apart.

Presented by Dr. Hugh Falconer.

M. 3064. Part of the left maxilla, showing the greater portion of (*Fig.*) m. 2 and the first five ridges of the unworn m. 3. Figured by Falconer and Cautley, *op. cit.* pl. xi. figs. 10, 10*a*.

Cautley Collection. Presented, 1842.

40794. A first upper milk-molar, vertically and longitudinally (*Fig.*) bisected, and containing four ridges. Figured by Falconer and Cautley, *op. cit.* pl. xii. figs. 1, 1 *a*, 1 *b*.

Presented by C. Falconer, Esq., 1867.

16332. The fourth right upper milk-molar, which has been vertically (*Fig.*) and longitudinally bisected. This specimen is figured by Falconer and Cautley, *op. cit.* pl. xii. fig. 2 [1]; it closely corresponds with the homologous tooth in No. 48930, but is smaller and relatively narrower; it has six ridges.

Cautley Collection. Presented, 1842.

M. 3065. Fragment of a maxilla containing the imperfect mm. 4 and m. 1. This specimen has been vertically and longitudinally bisected. *Cautley Collection. Presented*, 1842.

M. 3066. A small tooth, which is probably an abnormal example of m. 1. *Cautley Collection. Presented*, 1842.

M. 3067. The germ of the first left upper true molar in a fragment of the palate. There are seven ridges.

Presented by Dr. Hugh Falconer.

[1] Wrongly described as the penultimate milk-molar.

M. 3068. (*Fig.*) Fragment of the right maxilla containing part of the much-worn m. 1 and the complete unworn m. 2. This specimen (woodcut, fig. 24) has been longitudinally and

Fig. 24.

Elephas planifrons.—Vertical and longitudinal section of the second upper true molar; from the Pliocene of the Siwalik Hills. ½.

vertically bisected, and is figured by Falconer and Cautley, *op. cit.* pl. ii. fig. 5 *a*, and also in 'Falconer's Palæontological Memoirs,' vol. i. pl. iv. fig. 2.

Cautley Collection. Presented, 1842.

M. 3070. (*Fig.*) The hinder half of the well-worn third right upper true molar of a small individual. This specimen (woodcut,

Fig. 25.

Elephas planifrons.—The hinder half of the third right upper true molar from the Pliocene of the Siwalik Hills. ⅔. The lower border of the figure is the inner border of the specimen.

fig. 25) is figured by Falconer and Cautley, *op. cit.* pl. xi. fig. 4; seven ridges remain, and its extreme width is only 0,063. *Presented by Dr. Hugh Falconer.*

M. 3071. The third right upper true molar, in a half-worn condition. The width of this specimen is 0,100; and its difference from the next specimen is very marked.
Cautley Collection. Presented, 1842.

36695. (*Fig.*) A half-worn specimen of the third right upper true molar, in a fragment of the maxilla. Figured by Falconer and Cautley, *op. cit.* pl. xiv. fig. 8. The crown is very narrow, and the ridges are very thick and placed far apart.
Presented by the Secretary of State for India, 1860.

M. 3069. A third upper true molar, containing ten ridges, which has been vertically and longitudinally bisected.
Cautley Collection. Presented, 1842.

36736. (*Fig.*) The nearly complete mandible, showing the well-worn m. 3, in which there were probably ten or eleven ridges. Figured by Falconer and Cautley, *op. cit.* pl. viii. figs. 2, 2 *a* (the plate is lettered *E. hysudricus*).
Presented by the Secretary of State for India, 1860.

M. 3073. (*Fig.*) The nearly complete mandible, showing the well-worn $\overline{\text{m. 3}}$, which has thirteen ridges. Figured by Falconer and Cautley, *op. cit.* pl. xi. fig. 2, and in 'Falconer's Palæontological Memoirs,' vol. ii. pl. vi.
Cautley Collection. Presented, 1842.

M. 3090. The imperfect mandible, showing $\overline{\text{m. 3}}$, which apparently has twelve ridges. *Presented by Dr. Hugh Falconer.*

M. 3091. The imperfect mandible, showing the much-worn $\overline{\text{m. 3}}$.
Cautley Collection. Presented, 1842.

40799. The partially-worn third right lower milk-molar, with six ridges. *Presented by C. Falconer, Esq.,* 1867.

M. 3076. Two imperfect specimens of the third lower milk-molar.
Cautley Collection. Presented, 1842.

48443. Part of a third lower milk-molar, probably belonging to this species. *Presented by C. Falconer, Esq.,* 1867.

16620. (*Fig.*) Part of the right ramus of the mandible, showing the alveolus of $\overline{\text{mm. 2}}$, the complete $\overline{\text{mm. 3}}$ (which has six ridges), and part of the germ of $\overline{\text{mm. 4}}$. Figured by Falconer and Cautley, *op. cit.* pl. xii. figs. 7, 7 *a*.
Cautley Collection. Presented, 1842.

M. 3077. Part of the left ramus of the mandible, containing the almost unworn $\overline{\text{mm. 4}}$, which has eight ridges.
Presented by Dr. Hugh Falconer.

M. 3078. Part of the right ramus of the mandible, containing the slightly worn $\overline{\text{mm. 4}}$, which has eight ridges.
Presented by Dr. Hugh Falconer.

M. 3079. (*Fig.*) Fragment of the left ramus of the mandible, containing the imperfect $\overline{\text{pm. 4}}$ (*in alveolo*), and the complete $\overline{\text{m. 1}}$, which has seven ridges. Figured by Falconer and Cautley, *op. cit.* pl. xii. figs. 10, 10 *a*, 11.
Cautley Collection. Presented, 1842.

48931. (*Fig.*) Fragment of the left ramus of the mandible, showing the complete $\overline{\text{mm. 4}}$ (in which there are eight ridges), and a fragment of the much-worn $\overline{\text{mm. 3}}$, beneath which is $\overline{\text{pm. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xii. figs. 8, 8 *a*.
Presented by C. Falconer, Esq., 1867.

40804. Fragment of the right ramus of the mandible, containing the greater part of $\overline{\text{mm. 4}}$, in which seven ridges remain.
Presented by C. Falconer, Esq., 1867.

M. 3082. (*Fig.*) Portion of the left ramus of the mandible of a small individual, containing part of $\overline{\text{m. 1}}$, and the complete germ of $\overline{\text{m. 2}}$[1], which has nine ridges. Figured by Falconer and Cautley, *op. cit.* pl. xi. fig. 6.
Cautley Collection. Presented, 1842.

36693. Fragment of the right ramus of the mandible, showing part of $\overline{\text{m. 2}}$ and the greater portion of $\overline{\text{m. 3}}$, which appears to have had eleven ridges.
Presented by the Secretary of State for India, 1860.

36694. Fragment of the left ramus of the mandible of a small individual, containing the greater part of the much-worn $\overline{\text{m. 3}}$. *Presented by the Secretary of State for India*, 1860.

M. 3080. Fragment of the left ramus of the mandible, containing the greater part of the half-worn $\overline{\text{m. 3}}$, which is intermediate in character between Nos. 36696 and 15351.
Cautley Collection. Presented, 1842.

[1] In its narrow posterior extremity this tooth resembles a third molar, but "intermediate" molars of *E. meridionalis* (No. 33376) sometimes exhibit the same feature.

M. 3081. Fragment of the right ramus of the mandible, containing the hinder half of $\overline{\text{m. 3}}$.
Cautley Collection. Presented, 1842.

16442. (*Fig.*) The left ramus of the mandible, containing the worn $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xi. fig. 3.
Cautley Collection. Presented, 1842.

M. 3074. (*Fig.*) Part of the left ramus of the mandible, containing the well-worn $\overline{\text{m. 3}}$, which has eleven ridges. Figured by Falconer and Cautley, *op. cit.* pl. xi. fig. 8 (as $\overline{\text{m. 2}}$).
Cautley Collection. Presented, 1842.

M. 3075. (*Fig.*) Fragment of the right ramus of the mandible, containing the well-worn $\overline{\text{m. 3}}$, which has ten ridges and a talon. The tooth is of enormous size, with the ridges wide apart, and is abnormally worn; it is figured by Falconer and Cautley, *op. cit.* pl. xii. fig. 13 A [1].
Cautley Collection. Presented, 1842.

M. 3084. Fragment of the left ramus of the mandible, containing a portion of $\overline{\text{m. 3}}$. *Cautley Collection. Presented*, 1842.

M. 3086. (*Fig.*) Part of the left ramus of the mandible, containing the much-worn $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. xi. fig. 7. *Cautley Collection. Presented*, 1842.

36696. (*Fig.*) Fragment of the right ramus of the mandible, containing the much-worn $\overline{\text{m. 3}}$, in which eight ridges remain. This specimen, which is figured by Falconer and Cautley, *op. cit.* pl. xiv. fig. 9, was associated with No. 36695, and, like that specimen, is remarkable for the great breadth of the ridges and their distance from one another, the space occupied by three ridges being 0,088.
Presented by the Secretary of State for India, 1860.

M. 3085. (*Fig.*) Hinder part of the third left lower true molar. Figured by Falconer and Cautley, *op. cit.* pl. xi. fig. 9.
Cautley Collection. Presented, 1842.

M. 2010. The third left lower true molar, vertically and longitudinally bisected. Figured by Falconer and Cautley, *op. cit.* pl. ii. fig. 5 *b*. *Cautley Collection. Presented*, 1842.

[1] In the description of the plate this specimen is referred to *E. hysudricus* (probably through an error of the editor), but is a typical specimen of the present species.

15351. The third right lower true molar in a half-worn condition, (*Fig.*) and containing ten ridges. Figured by Falconer and Cautley, *op. cit.* pl. xii. figs. 12, 12 *a*. The ridges are unusually narrow, placed very close together (the space occupied by three ridges being only 0,054), and have but a very slight mesial expansion. The contrast in this respect between the present specimen and No. 36696 is very great, but they are connected together by insensible gradations, and the variation is enhanced by the difference in the degree of wear of the two specimens.

Cautley Collection. Presented, 1842.

M. 1997. Fragment of the right ramus of the mandible, containing $\overline{\text{m. 3}}$, which has been longitudinally and vertically bisected.

Transferred from the Old Indian Museum, 1880.

M. 3087. The greater part of the third right lower true molar. (*Fig.*) Figured by Falconer and Cautley, *op. cit.* pl. xi. fig. 5, and pl. xviii. A. figs. 2, 2 *a* ; the ridges (of which eight remain) are placed wide apart. *Presented by Dr. Hugh Falconer.*

The two following specimens were referred by Falconer to the present species ; they have, however, the ridge-formula of E. hysudricus, *and their enamel is more plicated and the ridges more approximated than is usual in the present form, and the second of them is almost indistinguishable from a tooth of* E. hysudricus (*No.* M. 3145) *; they may indicate a form connecting the two species.*

M. 3088. Part of the right ramus of a mandible, containing a fragment of $\overline{\text{m. 2}}$ and the partially worn $\overline{\text{m. 3}}$, which has fourteen ridges. Noticed in 'Falconer's Palæontological Memoirs,' vol. i. p. 434, note 3.

Cautley Collection. Presented, 1842.

M. 3083. Part of the left ramus of the mandible, containing the (*Fig.*) half-worn $\overline{\text{m. 3}}$, which has fourteen ridges. Figured by Falconer and Cautley, *op. cit.* pl. xii. fig. 13.

Cautley Collection. Presented, 1842.

The following specimen is not specifically determined, but apparently indicates an Elephant allied to, or identical with, the present species.

M. 3089. Fragment of a right mandibular ramus, containing five (*Fig.*) ridges of a well-worn true molar : from the Pleistocene of

the Narbada Valley, India. Figured (without specific determination) by Falconer and Cautley, *op. cit.* pl. lvi. figs. 13, 13 *a*.

Presented by C. Fraser, Esq., 1849.

Elephas meridionalis, Nesti[1].

Syn. *Loxodon meridionalis*, auct.

Leith-Adams[2] gives the ridge-formula, exclusive of talons, approximately as Mm. $\frac{3.6.8}{3.6.8}$, M. $\frac{(8\text{–}9).(9\text{–}11).(13\text{–}14)}{(7\text{–}9).(9\text{–}11).(11\text{–}14)}$; the ciphers being very similar to those of *E. planifrons*, but with a rather higher average. The cheek-teeth usually so closely resemble those of the latter species, that if they both occurred in the same area it is more than doubtful if they could be specifically distinguished. Both frequently exhibit partial denudation of the enamel-ridges when much worn. There is considerable variation in the thickness of the enamel and in the breadth of the ridges; and some of those molars in which the enamel is relatively thin and considerably plicated, and the ridges narrow and closely approximated, approach very near to some molars of *E. hysudricus* and *E. antiquus*[3],—the resemblance being greatest when the teeth are much worn. The cranium[4] is characterized by the large, slightly-curved incisors and the diverging incisive alveoli[5]. In general contour it is intermediate between *E. planifrons* and *E. hysudricus*, although nearer to the latter than the former[6]. It agrees with the former to a certain extent in the relative distance between the nasals and the vertex; but has the vertex more vaulted, the frontal profile concave[7], the occiput with a deep fissure for the nuchal ligament, and the temporal fossæ intruding largely on the frontal aspect. These features are, however, not so strongly developed as in *E. hysudricus*, and the present species may be regarded as one which, while retaining a dentition very like that of *E. planifrons*, has a cranium more closely resembling that of *E. hysudricus*, and thus forming a connecting link between the two, although it cannot probably be regarded as the directly intermediate species. The species attained an enormous size, the height of some individuals

[1] Nuov. Giorn. Letter. 1825, p. 195, *teste* Meyer.

[2] British Fossil Elephants (Mon. Pal. Soc.), p. 208.

[3] *Ibid.* p. 199, note.

[4] Fauna Antiqua Sivalensis, pls. xlii., xliv. fig. 19 (lettered *E. antiquus*).

[5] Leith-Adams says that the incisive alveoli are nearly parallel.

[6] See 'Falconer's Palæontological Memoirs,' vol. ii. p. 126.

[7] In the 'Fauna Antiqua Sivalensis,' pl. xliv. fig. 19, this concavity is not sufficiently marked; see 'Falconer's Palæontological Memoirs,' vol. ii. p. 124.

being estimated at upwards of fifteen feet. For a summary of the points distinguishing the molars of this species from those of *E. antiquus*, see Leith-Adams, *op. cit.* p. 232.

Hab. Middle and South Europe, and (probably) North Africa[1]. On the Continent the species occurs in the Upper Pliocene of the Val d'Arno and the Auvergne; while its range in England extends from the Red Crag to the Forest-bed, after which it is unknown[2].

33378. The imperfect third upper milk-molar; dredged off Happisburgh, Norfolk. *Layton Collection. Purchased*, 1858.

33380. The fourth upper milk-molar, in a half-worn condition; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

37336. Cast of a fragment of the right maxilla, containing the half-worn m. 2. The original is from the Upper Pliocene of the Val d'Arno (Tuscany), Italy. The specimen is noticed by Leith-Adams in his 'British Fossil Elephants' (Mon. Pal. Soc.), p. 199. *Purchased*, 1869.

33355. The second left upper true molar, in a half-worn condition; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

33330. A small example of the third left upper true molar, in an early stage of wear; dredged off Happisburgh. This specimen has thirteen ridges; and is noticed by Leith-Adams, *op. cit.* p. 198[3].
Layton Collection. Purchased, 1858.

33334. (*Fig.*) The third left upper true molar, in a middle stage of wear; dredged off Happisburgh. Described and figured by Leith-Adams, *op. cit.* p. 198, pl. xxiv. fig. 2.
Layton Collection. Purchased, 1858.

33338. A half-worn third right upper true molar; dredged off Happisburgh. *Layton Collection. Purchased*, 1858.

28820. The third left upper true molar, in a well-worn condition; from the Val d'Arno. This specimen is noticed by Leith-Adams, *op. cit.* p. 199, as being practically indistinguish-

[1] Thomas, Mém. Soc. Géol. France, sér. 3, vol. iii. pt. 2, p. 20 (1884).
[2] See Boyd-Dawkins, Quart. Journ. Geol. Soc. vol xxxvi. p. 396 (1880).
[3] Also noticed on page 29 of the same work as belonging to *E. antiquus*.

able from a well-worn molar of *E. antiquus*, owing to the extensive plication of the enamel.

Presented by J. B. Pentland, Esq., 1853.

40840. Cast of the hinder half of a well-worn third upper true molar. The original is from the Pliocene of Marseilles, France. *Presented by Charles Falconer, Esq.*, 1867.

33357. The hinder half of a well-worn third upper true molar; dredged off Happisburgh.

Layton Collection. Purchased, 1858.

33345. Part of a well-worn third right upper true molar; dredged off Happisburgh. *Layton Collection. Purchased*, 1858.

33331. Anterior half of a slightly worn third upper true molar; dredged off Happisburgh.

Layton Collection. Purchased, 1858.

33358. The base of a very much worn third upper true molar; dredged off Happisburgh.

Layton Collection. Purchased, 1858.

33346. The greater portion of a well-worn third right upper true molar, provisionally referred to this species; dredged off Happisburgh. The enamel is much plicated.

Layton Collection. Purchased, 1858.

7436. (*Fig.*) The greater part of a half-worn third upper true molar belonging either to this species or to *E. antiquus*; dredged off Happisburgh. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. B. fig. 13, and noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 137, also by Leith-Adams, *op. cit.* p. 195.

Mantell Collection. Purchased, 1836.

37274. A distorted third upper true molar; from the Pleistocene of Cromer, Norfolk. *Brown Collection.*

Presented by Prof. Sir R. Owen, K.C.B., 1859.

33347, 33352, 33359, 33361. Four portions of much-worn late upper true molars; dredged off Happisburgh.

Layton Collection. Purchased, 1858.

46224. Part of a much-worn late upper true molar, probably belonging to the present species; dredged off the eastern coast of England. *Owles Collection. Purchased*, 1874.

40838. The hinder part of a (probably) third right upper true molar, agreeing in general character with the teeth of the present species; from a Pliocene or Pleistocene deposit in Russia.
Presented by C. Falconer, Esq., 1867.

37334. Cast of the mandible, showing the well-worn $\overline{m.2}$ and the (*Fig.*) impefectly protruded $\overline{m.3}$ of either side. The original is from the Val d'Arno. The specimen is described by Leith-Adams, *op. cit.* pp. 204–5 (as No. 3733), and figured on pp. 136, 139, and 142. *Purchased*, 1869.

28824. The fourth left lower milk-molar, wanting the anterior talon and showing eight ridges; from the Val d'Arno. Noticed by Leith-Adams, *op. cit.* p. 190 (as No. 38824); it is practically indistinguishable from the corresponding tooth of *E. planifrons*, No. 48931.
Presented by J. B. Pentland, Esq., 1853.

33387. The fourth left lower milk-molar, in a half-worn condition; dredged off Happisburgh. The specimen is noticed by Leith-Adams, *op. cit.* p. 18, where it is referred to *E. antiquus*; it presents, however, no character by which it can be distinguished from No. 28824.
Layton Collection. Purchased, 1858.

33385. The imperfect fourth left lower milk-molar, in an early stage of wear; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

33372. The almost unworn first right lower true molar; dredged off Happisburgh. *Layton Collection. Purchased*, 1858.

33376. The unworn first left lower true molar; from Happisburgh. This tooth is noticed by Leith-Adams, *op. cit.* p. 192; it has eight ridges, and the posterior extremity is very narrow. *Layton Collection. Purchased*, 1858.

33384. The imperfect first left lower true molar; dredged off Happisburgh. *Layton Collection. Purchased*, 1858.

33368. An unworn but rolled first lower true molar; dredged off Happisburgh. Noticed by Leith-Adams, *op. cit.* p. 191.
Layton Collection. Purchased, 1858.

31337. Cast of the germ of the second (?) lower true molar. The original is from the Val d'Arno, and is preserved in the Florentine Museum at Pisa. *Purchased*, 1863.

33343. The second left lower true molar, in an early stage of wear; (*Fig.*) dredged off Happisburgh. Described and figured by Leith-Adams, *op. cit.* p. 194, pl. xxiii. figs. 1, 1 *a*; it has eleven ridges. *Layton Collection. Purchased*, 1858.

33191. The second (?) left lower true molar, in a much-worn condition; found on the beach at Easton Cliff, Suffolk. *Purchased*, 1858.

33356. The imperfect second (?) right lower true molar, in a half-worn condition; dredged off Happisburgh. *Layton Collection. Purchased*, 1858.

M. 3412. Fragment of the right ramus of the mandible, containing (*Fig.*) the much-worn $\overline{\text{m. 1}}$ or $\overline{\text{m. 2}}$; from the Val d'Arno. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. B. fig. 10. *Purchased.*

33365. Part of the right ramus of the mandible, containing part of $\overline{\text{m. 1}}$ and the complete, unworn, $\overline{\text{m. 2}}$; dredged off Happisburgh. Noticed by Leith-Adams, *op. cit.* p. 194. *Layton Collection. Purchased*, 1858.

28820 a. The second (?) right lower true molar; from the Val d'Arno. Noticed by Leith-Adams, *op. cit.* p. 195: if its serial position be correct, the tooth is of large size. *Presented by J. B. Pentland, Esq.*, 1853.

28819. Part of the left ramus of the mandible, showing part of $\overline{\text{m. 2}}$ and the complete $\overline{\text{m. 3}}$; from the Val d'Arno. There are twelve ridges in $\overline{\text{m. 3}}$. *Presented by J. B. Pentland, Esq.*, 1853.

46212. An unworn example of the third left lower true molar, containing thirteen ridges; dredged off the eastern coast of England. *Owles Collection. Purchased*, 1874.

33333. The greater part of the third right lower true molar, in a half-worn condition; dredged off Happisburgh. This tooth is of enormous size. *Layton Collection. Purchased*, 1858.

33354. The third right lower true molar, in an early stage of wear; (*Fig.*) dredged off Happisburgh. Described and figured by Leith-Adams, *op. cit.* p. 198, pl. xxiv. fig. 1; there are fourteen ridges. *Layton Collection. Purchased*, 1858.

33332. The third left lower true molar in an early stage of wear and imperfect anteriorly; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

46225. A worn example of the third right lower true molar; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

37337. Cast of the hinder half of the third (?) right lower true molar. The original is from the Val d'Arno, and is preserved in the Florentine Museum at Pisa. The specimen is noticed by Leith-Adams, *op. cit.* p. 199.
Purchased, 1863.

37335. Cast of part of the left ramus of the mandible, containing the much-worn $\overline{\text{m. 3}}$. The original is from the Val d'Arno, and is preserved in the Florentine Museum at Pisa. *Purchased*, 1863.

46213. Portion of a worn third (?) lower true molar, showing three complete ridges, which are very broad and unusually far apart; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

33349. Anterior part of a worn third lower true molar; dredged off Happisburgh. *Layton Collection. Purchased*, 1858.

44016. Anterior part of the second (?) left lower true molar, in a worn condition; dredged off the eastern coast.
Bean Collection. Purchased, 1859.

33348, 33350, 33360, 33362. Four fragments of worn lower true molars; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

33340. Fragment of the anterior half of a late lower true molar, in a well-worn condition; dredged off Happisburgh. This specimen exhibits very beautifully the denudation of the ridges so characteristic of much-worn molars of this species and *E. planifrons*.
Layton Collection. Purchased, 1858.

33339, 33344. Two fragments of late lower true molars, in an unworn condition; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

17032. Fragment of a lower true molar, in an unworn condition; from the Forest-bed of Norfolk.
Green Collection. Purchased, 1843.

M. 2009. Part of the symphysis of a mandible, provisionally referred to this species; from the Norwich Crag of Thorpe, Norwich. *Presented by Dr. H. Woodward.*

40795. A true molar, vertically and longitudinally cut and polished; probably dredged off Happisburgh.
Presented by C. Falconer, Esq., 1867.

28513. A true molar, horizontally bisected; probably from the Pleistocene of the eastern coast.
Dixon Collection. Purchased, 1853.

28511. Horizontal section of a third true molar; from the Forest-bed of Norfolk. *Dixon Collection. Purchased*, 1853.

46907. Vertical and longitudinal section of a true molar; from the Forest-bed of Norfolk. *Purchased*, 1875.

46214. Fragment of a third true molar, horizontally cut and polished; dredged off the Dogger-bank. Noticed by Leith-Adams, *op. cit.* p. 198.
Owles Collection. Purchased, 1874.

46935. Fragment of a true molar, vertically and longitudinally cut; from the Forest-bed of Norfolk. *Purchased*, 1876.

44634. Two ridges of a true molar, horizontally cut and polished; from the Forest-bed of Norfolk. *Purchased*, 1873.

33200. Vertical section of two ridges of a true molar; locality unknown. *Hastings Collection. Purchased*, 1855.

44895. Four ridges of a true molar, transversely cut and polished; from the Red Crag of Felixstowe, Suffolk.
Purchased, 1874.

44140. Fragment of a molar, vertically and longitudinally cut and polished; from the Red Crag of Fakenham, near Woodbridge, Suffolk. *Purchased*, 1873.

Some of the following specimens are only provisionally referred to the present species; unless otherwise stated, they were dredged off Happisburgh, and belong to the Layton Collection, purchased, 1858.

33404. The glenoidal extremity of the left scapula.

33399. Part of the head of a humerus.

33401. The distal extremity of the left humerus.

33406. The distal epiphysis of the left ulna, of very large size.

43849. A small radius, wanting the distal extremity; from the Forest-bed of Norfolk. *Purchased*, 1872.

33415–6. Two specimens of the right lunar, one much larger than the other. *Layton Collection. Purchased*, 1858.

18372–3. Two specimens of the right lunar, one much larger than the other; from the Pleistocene of the Norfolk coast. *Presented by E. Charlesworth, Esq. About* 1843.

28007. The left cuneiform; from the Pleistocene of Clacton, Essex. *Presented by John Brown, Esq.*, 1852.

33417. The imperfect left cuneiform, of small size.

33418. The right trapezium. Described and figured by Leith-Adams, *op. cit.* p. 160, pl. xix. fig. 10. (*Fig.*)

33409. The right magnum.

33410–13–14. Three specimens of the left magnum.

33407–11. Two specimens of the right unciform, one much larger than the other.

33408. The left unciform.

33429. The third right metacarpal.

37746. The third right metacarpal; probably from the Norfolk coast. *Purchased*, 1863.

33428. The third left metacarpal. Described and figured by Leith-Adams, *op. cit.* p. 234, pl. xviii. fig. 5. (*Fig.*)

33434. The fourth right metacarpal.

33433. The fifth left metacarpal. Described and figured by Leith-Adams, *op. cit.* p. 234, pl. xviii. fig. 8. (*Fig.*)

33432. The fifth left metacarpal.

33445. An acetabulum.

36420 a, b. Two portions of innominates; dredged off Clacton in 1859. *Brown Collection.* *Presented by Prof. Sir R. Owen, K.C.B.*, 1859.

33395. Fragment of a pubis.

33394. Part of the head of a femur.

33397. The head of a femur.

33442. A patella.

33446. The proximal extremity of a tibia.

36422. The distal extremity of a tibia; dredged off Clacton. *Brown Collection. Presented by Prof. Sir R. Owen, K.C.B.*, 1859.

33443–4. Two specimens of the distal extremity of the tibia.

46724. Cast of the right fibula. The original was obtained from the Forest-bed of Cromer, and is in the collection of A. Haviland, Esq., of Northampton. *Made in the Museum*, 1874.

33420. The right calcaneum. Noticed by Leith-Adams, *op. cit.* p. 64 (as *E. antiquus*).

33421. The right calcaneum.

33423. The left calcaneum.

33424. The right astragalus.

M. 78. The right astragalus; found on the beach at Happisburgh. *Presented by J. Wood Hall, Esq.*, 1878.

18369. The right astragalus; from the Pleistocene of the Norfolk coast. *Presented by E. Charlesworth, Esq. About* 1843.

33425. (*Fig.*) The left astragalus. Described and figured by Leith-Adams, *op. cit.* pp. 170, 234, pl. xix. fig. 6.

33426. The left astragalus of a small individual.

33427. The right navicular.

33436. The second left metatarsal.

39465. The second left metatarsal; from the Norfolk coast. *Bowerbank Collection. Purchased*, 1865.

33437. The second right metatarsal.

33435. The fourth right metatarsal.

33440–1. Two phalangeals.

36436. (*Fig.*) The atlas vertebra; dredged off the Essex coast. Described and figured by Leith-Adams, *op. cit.* pp. 57, 210, 232, pl. xvii. fig. 3. *Brown Collection. Presented by Prof. Sir R. Owen, K.C.B.*, 1859.

33447. The slightly imperfect atlas vertebra.

27872. The axis vertebra; dredged off the Essex coast. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* pp. 211, 232, pl. xvii. fig. 4. *Presented by John Brown, Esq.*, 1852.

33448. The centrum of the atlas vertebra, wanting the hinder epiphysis and part of the odontoid processs.

Elephas hysudricus, Falconer and Cautley[1].

Syn. *Euelephas hysudricus*, auct.

Pohlig[2] has proposed to identify this species with *E. meridionalis*, but both the dentition and cranium indicate a more specialized form. The ridge-formula[3], excluding talons, appears to be:—Mm. $\frac{3.(5\text{–}7).(9\text{–}11)}{3.(7\text{–}9).(9\text{–}11)}$, M. $\frac{(9\text{–}12).(10\text{–}12).(13\text{–}17)}{(9\text{–}12).(12\text{–}13).(14\text{–}18)}$. The crowns of the cheek-teeth are wide in proportion to their length, and their ridges are usually taller, narrower, and more numerous than in *E. meridionalis*; the enamel is frequently very thin and much plicated, and the ridges are closely approximated, with their worn dentine surfaces relatively narrow. In other specimens, however, the enamel is thicker, the plication very slight, and the ridges less numerous, thicker, and placed further apart, with broader and more mesially-expanded dentine surfaces; and such specimens approach very closely to certain molars of *E. meridionalis* and *E. planifrons*. The cranium of the adult[4] is very like that of the former species; but has the vertex more vaulted, the fissure on the occiput for the ligamentum nuchæ deeper and extending on to the facial aspect, the frontal cavity deeper, and the temporal fossæ larger. In the young cranium[5] the frontal cavity is wanting. In the majority of these cranial characters the species agrees with *E. indicus*; and, although the frontal concavity and the occipital fissure are more exaggerated in the fossil, it is not improbable that the one form may be the direct ancestor of the other.

The present species attained dimensions fully equal to those of *E. meridionalis*.

Hab. India (Pliocene of the Siwalik Hills and Punjab, and [apparently] Pleistocene of the Narbada Valley). Unless otherwise stated, the following specimens are from the Siwalik Hills, and belong to the *Cautley Collection, presented*, 1842.

[1] Fauna Antiqua Sivalensis, pt. 1, p. 41 (1846).

[2] Sitz. niederrhein. Ges. Feb. 4th, 1884.

[3] Slightly modified from the one given in the 'Palæontologia Indica,' ser. 10, vol. i. p. 285.

[4] Fauna Antiqua Sivalensis, pls. xliii., xlv. figs. 20 *a*.

[5] *Ibid.* pls. xliii., xlv. figs. 20 *b*.

M. 3109. The cranium of an adult, with the crowns of the molars (*Fig.*) broken off. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pls. iv., and v. figs. 1, 2. This and the following specimens are the types of the species.

Purchased, 1838.

M. 3110. The imperfect cranium, showing the well-worn m. 2, and (*Fig.*) m. 3 just coming into wear. Figured by Falconer and Cautley, *op. cit.* pl. v. figs. 3 and 4[1]. There are seventeen ridges in m. 3.

M. 3111. The occipital portion of the cranium, showing the deep fissure for the nuchal ligament so characteristic of the species.

M. 3112. An imperfect immature cranium, showing a fragment of the much-worn mm. 4, the half-worn m. 1, and m. 2 *in alveolo*. There are nine ridges in m. 1.

M. 3113. An imperfect immature cranium, showing mm. 4 and m. 1. The teeth of the right side have been longitudinally and vertically bisected; and there are ten ridges in m. 1.

M. 3114. The cranium of a young individual, showing the much-(*Fig.*) worn mm. 3, mm. 4, and m. 1 *in alveolo*. Figured by Falconer and Cautley, *op. cit.* pl. vi. figs. 1, 2. There are seven ridges in mm. 4; and the incisive alveoli diverge.

Presented by the Council of the Geological Society.

M. 3115. The middle part of a young cranium, showing mm. 3 (much (*Fig.*) worn) and mm. 4 (slightly worn); there are ten ridges in mm. 4. Figured by Falconer and Cautley, *op. cit.* pl. vi. fig. 4, and pl. vii. fig. 1.

Presented by the Council of the Geological Society.

M. 3116. The imperfect young cranium, with mm. 3 and mm. 4; the latter is almost unworn, and has nine ridges.

M. 3117. The palate, showing the half-worn m. 3.

M. 3118. The palate, showing the half-worn m. 3. The crowns exhibit considerable denudation of the ridges.

18440. The palatal region of the cranium, showing m. 3 in a middle stage of wear.

M. 3119. The palate, showing the well-worn m. 1, and the unworn m. 2, in which there are eleven ridges.

[1] The description of the plate is erroneous.

16194. The palate, showing the well-worn mm. 4 (seven ridges) and the unworn m. 1 (ten ridges).

M. 3120. The palatal region of the cranium, showing mm. 3, mm. 4, and m. 1 (in germ). There are nine ridges in mm. 4.

M. 3121. Fragment of the left maxilla, containing the well-worn mm. 3 and the first half of the unworn mm. 4.

M. 3134. The third right upper (?) milk-molar, vertically and longitudinally bisected.

M. 3122. A slightly-worn mm. 4 or m. 1, with ten ridges. The ridges are relatively thick.

M. 3123. (*Fig.*) The first right upper true molar, longitudinally and vertically bisected. Figured by Falconer and Cautley, *op. cit.* pl. vii. figs. 2, 2 *a*. There are eleven ridges, which are tall and narrow.

M. 3124. A first upper true molar, in an early stage of wear. The enamel is thick and shows no distinct plication.

M. 3125. Hinder part of a much-worn first upper (?) true molar, showing strongly plicated enamel.

M. 1999. Fragment of a longitudinally and vertically bisected right maxilla, showing m. 2 and part of m. 3. There are eleven ridges in m. 2, which are relatively wide.

Transferred from the Old Indian Museum, 1880.

M. 3127. (*Fig.*) Fragment of the right maxilla, containing m. 2, which has been vertically and longitudinally bisected. There are thirteen or fourteen ridges, and the enamel is thin and plicated. Figured by Falconer and Cautley, *op. cit.* pl. vii. figs. 3, 3 *a*.

40802. The greater part of the well-worn third left upper true molar; from the Siwaliks of the Punjab. Twelve ridges remain, and the enamel is thin and plicated.

Presented by C. Falconer, Esq., 1867.

M. 3128. Fragment of the left maxilla, with m. 3 in an early stage of wear. There are fifteen ridges in the tooth, and the enamel is thin and not plicated; the tooth approaches very closely to some specimens of *E. meridionalsi*.

M. 3129. (*Fig.*) The third right upper true molar in an early stage of wear, showing sixteen or seventeen ridges. Figured by Falconer and Cautley, *op. cit.* pl. vii. fig. 4 (in description of plate referred to *E. indicus*).

M. 3130. The greater portion of a half-worn third right upper true molar; probably from the Siwaliks of the Punjab. This specimen has a very wide crown, the enamel is much plicated, and the ridges are closely approximated; it presents some resemblance to certain molars of *E. namadicus*, but the ridges are more approximated and their extremities do not curve backwards. *No history.*

36688. A third upper true molar containing seventeen ridges, which has been longitudinally and vertically bisected.
Presented by the Secretary of State for India, 1860.

M. 3126. The third right upper true molar, in a comparatively early stage of wear, and containing sixteen ridges, which has been vertically and longitudinally bisected.

M. 3140. (*Fig.*) The entire mandible of a young individual, showing on both sides the well-worn $\overline{\text{mm.}4}$ and the germ of $\overline{\text{m}1}$. Figured by Falconer and Cautley, *op. cit.* pl. viii. fig. 4 (left ramus) and pl. xiii. A. fig. 7. There are nine ridges in the anterior and apparently eleven in the hinder tooth. This beautiful specimen is in much finer preservation than is usually the case with the fossils of the typical Siwalik Hills, and is worthy of being figured on a larger scale. The form of the symphysial gutter closely resembles that of *E. meridionalis*. *Presented by Dr. Hugh Falconer.*

M. 3131. (*Fig.*) Fragment of the left ramus of a mandible, containing the unworn $\overline{\text{mm.}2}$ and the nearly complete germ of $\overline{\text{mm.}3}$, provisionally referred to this species. Figured by Falconer and Cautley, *op. cit.* pl. xiv. figs. 10, 10*a*, as *E. hysudricus*, but subsequently referred by Falconer (Palæontological Memoirs, vol. ii. p. 92) to *E. planifrons*. Six ridges remain in $\overline{\text{mm.}3}$, and from the height of these ridges it seems not improbable that the original determination is the correct one.

M. 3132. Fragment of a mandibular ramus provisionally referred to this species, containing $\overline{\text{mm.}2}$ and $\overline{\text{mm.}3}$; the latter tooth is very similar to $\overline{\text{mm.}3}$ of the last specimen, but the former is rather more complex.

M. 3133. Fragment of the right ramus of the mandible, showing the broken base of $\overline{\text{mm. 2}}$, and the germ of $\overline{\text{mm. 3}}$ containing seven ridges of which the summits are wanting.

M. 3135. The germ of the third left lower (?) milk-molar, containing nine ridges. Figured by Falconer and Cautley, *op. cit.* pl. vii. fig. 6.

M. 3136. Fragment of the left ramus of the mandible, containing the well-worn $\overline{\text{mm. 3}}$ and part of the germ of $\overline{\text{mm. 4}}$. There are seven ridges in $\overline{\text{mm. 3}}$.

Presented by Dr. Hugh Falconer.

16822. (*Fig.*) Fragment of the left ramus of the mandible, showing the alveolus of $\overline{\text{mm. 2}}$ and the complete $\overline{\text{mm. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. vii. fig. 5. The tooth, which is about one-third worn, shows seven or eight ridges, and has been vertically and longitudinally bisected since it was figured.

16621. (*Fig.*) Fragment of the left ramus of the mandible, containing $\overline{\text{mm. 4}}$. Figured by Falconer and Cautley *op. cit.* pl. vii. figs. 7, 7*a*; the tooth is half-worn and has seven or eight ridges.

M. 3137. (*Fig.*) The fourth left lower milk-molar in a half-worn condition, containing nine ridges. Figured by Falconer and Cautley, *op. cit.* pl. vii. fig. 8.

18463. Part of the left ramus of the mandible, showing portions of $\overline{\text{mm. 4}}$ and the germ of $\overline{\text{m. 1}}$.

M. 3138. Fragment of the right ramus of the mandible, showing the greater part of $\overline{\text{mm. 4}}$ and the germ of $\overline{\text{m. 1}}$. There appear to have been ten ridges in the former.

Presented by C. Falconer, Esq., 1867.

M. 3139. Part of the right ramus of the mandible, showing a fragment of the much-worn $\overline{\text{mm. 4}}$ and the perfect $\overline{\text{m. 1}}$. One side of the latter tooth (which contains ten ridges) has been cut and polished.

M. 3147. Fragment of the right ramus of the mandible, containing the nearly perfect $\overline{\text{m. 1}}$. The tooth is half worn and has nine ridges. *Presented by Dr. Hugh Falconer.*

18413. Part of a well-worn first lower true molar.

M. 3141. Part of a mandibular ramus, showing a fragment of the much-worn $\overline{\text{m. 1}}$ and the germ of $\overline{\text{m. 2}}$.

M. 3142. (*Fig.*) Fragment of the left ramus of the mandible, containing the second (?) true molar in an early stage of wear; from the Pleistocene of the Narbada Valley, India. Figured by Falconer and Cautley, *op. cit.* pl. xii. c. fig. 6. There are eleven ridges in the tooth.

Presented by C. Fraser, Esq., 1849.

18461. (*Fig.*) The greater part of the right ramus of the mandible, containing the well-worn $\overline{\text{m. 3}}$, which has ten ridges remaining. Figured by Falconer and Cautley, *op. cit.* pl. viii. fig. 3.

M. 3143. (*Fig.*) Part of the right ramus of the mandible of a very old individual, showing a fragment of the much-worn $\overline{\text{m. 3}}$. Figured by Falconer and Cautley, *op. cit.* pl. viii. fig. 5.

M. 3144. Fragment of the left ramus of a mandible, referred by Falconer to the present species. This specimen contains the greater portion of the half-worn $\overline{\text{m. 3}}$, which has been longitudinally and vertically bisected. The ridges are relatively high, and thereby agree with the present form; but the enamel is very thick, and the worn crown-surface is exceedingly like that of *E. meridionalis*.

M. 3145. (*Fig.*) Part of the left ramus of the mandible, containing the greater portion of the well-worn $\overline{\text{m. 3}}$, in which there are thirteen ridges remaining. Figured by Falconer and Cautley, *op. cit.* pl. vii. figs. 11, 11 *a* (as ? $\overline{\text{m. 2}}$).

M. 3146. (*Fig.*) Fragment of the right ramus of the mandible, containing the third true molar, which has been longitudinally and vertically bisected, and shows eighteen ridges. Figured by Falconer and Cautley, *op. cit.* pl. i. fig. 3 *b*, and pl. vii. figs. 12, 12 *a*. The enamel is very thin and much plicated.

Elephas antiquus, Falconer[1].

Syn. *Elephas* (*Loxodon*) *priscus*, Falconer and Cautley[2].
Euelephas antiquus, auct.
Including *Elephas* (*antiquus*) *trogontherii*, Pohlig[3].

The ridge-formula[4], excluding talons, may be represented as Mm. $\frac{(2\text{–}3)\,.\,(5\text{–}7)\,.\,(8\text{–}11)}{3\quad .(6\text{–}8)\,.\,(9\text{–}11)}$, M. $\frac{(9\text{–}12)\,.\,(12\text{–}13)\,.\,(15\text{–}20)}{(11\text{–}12)\,.\,(12\text{–}13)\,.\,(16\text{–}21)}$. The ridges are generally higher and more numerous than in *E. hysudricus*, but less so than in *E. primigenius*. The molars are usually relatively narrow in respect to their length and height, this feature being apparent even in the "broad-crowned" and "thick-ridged" varieties. Generally in the upper, and almost always in the lower, molars there is a slight mesial expansion of the worn disks of the ridges, which may or may not be angulated. The plication of the enamel varies greatly, being most marked in the "narrow-crowned" variety, and least so in the "broad-crowned" variety, in which the mesial expansion is often wanting; the enamel is usually thicker than in *E. primigenius*. The molars are subject to great variation—those of the thick-ridged variety (Falconer's *E. priscus*) approaching very closely to those of *E. africanus*, while other specimens approximate to *E. meridionalis*, and others again to *E. primigenius*. The incisor is either gently curved as in *E. indicus*, or straight; it narrows gradually from base to tip. The characters of the cranium are not fully known, but the mandible approximates to that of *E. africanus*. The species attains a large size, Pohlig (*op. cit.*) stating that it even exceeds *E. meridionalis* in this respect; a small race from the cave of Cucigliana, Monti Pisani, Tuscany, has been distinguished by Acconci[5] as var. *nanus*.

Hab. Europe, apparently not ranging north of Yorkshire. In

[1] Quart. Journ. Geol. Soc. vol. xiii., table facing p. 319 (1857). Molars of this species had been previously figured in the 'Fauna Antiqua Sivalensis,' pls. xiv. (1846), xiv. A. (1847), but were named *E. meridionalis*; the name *E. antiquus* also occurs on pl. xiv. B. (1847) of the same work, but was applied to molars of *E. meridionalis*.

[2] 'Fauna Antiqua Sivalensis,' pt. 2, pl. xiv. (1846). The specimens were provisionally identified with *E. priscus*, Goldfuss (Nova Acta Ac. Cæs. Leop.-Car. vol. xi. art. 2, p. 489 [1823]), which was apparently applied to molars of the African Elephant ('Falconer's Palæontological Memoirs,' vol. ii. pp. 94, 95). *E. priscus*, F. & C., has the priority over *E. antiquus*, but the latter is too universally accepted to be abolished.

[3] Sitz. niederrhein. Ges. Feb. 4th, 1884.

[4] Slightly modified from Leith-Adams, 'British Fossil Elephants' (Mon. Pal. Soc.), p. 176. If the talons be included the formula will be higher, see Leith-Adams, *op. cit.* p. 231.

[5] Atti Soc. Tosc. Sci. Nat. vol. v. p. 150 (1881).

England it certainly ranges from the Forest-bed to the close of the Pleistocene [1], and it probably occurs in the Norwich Crag (*vide infrà*, p. 124); specimens from the Red Crag have been figured by Leith-Adams [2], and provisionally referred to this species, but the writer considers it more probable that they belong to *E. meridionalis*. It not improbably occurs also in the Lower Pleistocene of North Africa [3]; in which region there also occurs *E. atlanticus*, Pomel [4], of the Upper Pleistocene, which appears to be a form connecting *E. antiquus* with *E. africanus*.

38491. The palate, showing the imperfect m. 3 of either side in a comparatively early stage of wear; from the Pleistocene of Peckham, Surrey. This specimen is described by Leith-Adams in his 'British Fossil Elephants' (Mon. Pal. Soc.), p. 39. *Purchased*, 1864.

21301. (*Fig.*) The palate, showing mm. 4 of either side in a half-worn condition; from the Pleistocene of Grays, Essex. This specimen is described and figured by Leith-Adams, *op. cit.* pp. 16, 17, pl. i. fig. 4, and is noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 177. *Purchased*, 1847.

33369. Fragment of the left maxilla, containing the half-worn and imperfect first upper true molar; dredged off Happisburgh, Norfolk. *Layton Collection. Purchased*, 1858.

27914. Part of the left maxilla, containing the half-worn mm. 4; from the Pleistocene of Clacton, Essex. Noticed by Leith-Adams, *op. cit.* p. 17.
Presented by John Brown, Esq., 1852.

27991. Fragment of the left maxilla, containing the imperfect mm. 3 in a half-worn condition; from Clacton. Noticed by Leith-Adams, *op. cit.* p. 14.
Presented by John Brown, Esq., 1852.

44783. Fragment of the left maxilla of a very young individual, showing mm. 2 and mm. 3; locality unknown. This specimen is noticed by Leith-Adams, *op. cit.* pp. 9, 13; there are six ridges in mm. 3, which is but slightly worn; its crown is relatively longer and less oval-shaped than in mm. 3 of *E. primigenius*. *Presented by B. Bright, Esq.*, 1873.

[1] See Boyd-Dawkins, Quart. Journ. Geol. Soc. vol. xxxvi. p. 396 (1880).
[2] 'British Fossil Elephants,' pl. xxvi. figs. 2, 4.
[3] See Thomas, Mém. Soc. Géol. France, sér. 3, vol. iii. art. 2, table facing p. 50 (1884).
[4] See Thomas, *loc. cit.*

28273. Fragment of the right maxilla, showing the partially-worn mm. 3; from the Norwich Crag of Suffolk. Noticed by Leith-Adams, *op. cit.* p. 14. *Purchased*, 1852.

21654. (*Fig.*) The unworn second right upper milk-molar; from the Pleistocene of Grays. Described and figured by Leith-Adams, *op. cit.* p. 9, pl. i. figs. 1, 1 *a*. *Purchased*, 1848.

M. 2003. A well-worn third upper milk-molar provisionally referred to this species; from the Norwich Crag of Easton, Suffolk. Noticed by Leith-Adams, *op. cit.* p. 13. This tooth is of a broader type than the preceding, and thereby approaches *E. meridionalis*. *No history.*

18810. (*Fig.*) The half-worn third right upper milk-molar; from Grays. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. figs. 2, 2 *a*[1]. *Purchased*, 1845.

18810 a. (*Fig.*) The half-worn third left lower milk-molar, probably belonging to the same individual as the preceding. This specimen has been vertically and longitudinally bisected, and is figured by Falconer and Cautley, *op. cit.* fig. 26. *Purchased*, 1845.

40990. (*Fig.*) Anterior half of an almost unworn third upper milk-molar; from the Pleistocene of Kent. Figured by Falconer and Cautley, *op. cit.* pl. xiv. A. figs. 1, 1 *a*. *Presented by the Trustees of the Canterbury Museum*, 1865.

40952. A much-worn third upper milk-molar; from a cavern in Raven's Cliff, Gower, Glamorganshire. Noticed by Leith-Adams, *op. cit.* p. 14. *Presented by Gen. E. R. Wood*, 1868.

23766 g. The third left upper milk-molar, in an early stage of wear; from Grays. Noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 177. *Purchased*, 1849.

40798. (*Fig.*) An imperfect fourth right upper milk-molar; from the Grotta di Maccagnone, near Palermo, Sicily. This specimen, which is of unusually small size, is described and figured by Busk in the Trans. Zool. Soc. vol. vi. p. 301, pl. liii. fig. 10. *Presented by C. Falconer, Esq.*, 1867.

18789 a. (*Fig.*) The fourth left upper milk-molar (?), in an early stage of wear; locality unknown. Figured by Falconer and Cautley, *op. cit.* pl. xiv. A. fig. 3, and noticed by Leith-Adams, *op. cit.* p. 17. This specimen is of large size, and may be m. 1. *Presented by the Earl of Aylesford*, 1845.

[1] For lettering of this and other figures in same work, see above.

21668. The associated right and left mm. 4, in an early stage of wear; from Grays. Noticed by Leith-Adams, *op. cit.* p. 17. *Purchased*, 1852.

43204. The fourth right upper milk-molar, in an early stage of wear; locality unknown.
Wetherell Collection. Purchased, 1871.

46937. A partially-worn fourth upper milk-molar; from the Pleistocene of the Norfolk coast. *Purchased*, 1876.

15925. The greater portion of the little-worn fourth right upper milk-molar; from the Pleistocene of Bacton, Norfolk.
Green Collection. Purchased, 1843.

M. 363. The fourth left upper milk-molar; from the Pleistocene of Coppenhall, Cheshire. The specimen is in an early stage of wear and shows eleven ridges and talons.
Egerton Collection. Purchased, 1882.

M. 2546–7. Two imperfect unworn teeth, which are either mm. 4 or m. 1; from the Pleistocene of Barrington, Cambridgeshire.
Purchased, 1885.

28984. An imperfect mm. 4 in an almost unworn condition; dredged off the eastern coast. *Purchased*, 1852.

Fig. 26.

Elephas antiquus.—The first left upper true molar; from the Pleistocene of Grays, Essex. ¾. The lower border of the figure is the inner border of the specimen.

M. 2004. The first left upper true molar in a half-worn condition; (*Fig.*) probably from Grays. This specimen (woodcut, fig. 26) agrees very closely in general characters with the Japanese molar of *E. namadicus* figured on page 168; it is noticed by Leith-Adams, *op. cit.* p. 22. *No history.*

M. 362. The first left upper true molar, in a half-worn condition; from the Pleistocene of Southwold, Suffolk.
Egerton Collection. Purchased, 1882.

28512. The associated right and left first upper true molars, about one-third worn; from the Pleistocene of Bracklesham Bay, Sussex. These specimens are noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 180, and by Leith-Adams, *op. cit.* p. 22. *Dixon Collection. Purchased*, 1853.

37241. The first right upper true molar, about one-third worn; (*Fig.*) dredged off Happisburgh, Norfolk. Described and figured by Leith-Adams, *op. cit.* p. 21, pl. iii. fig. 2.
Layton Collection. Purchased, 1858.

43067. Fragment of a much-worn first (?) upper true molar; from the Pleistocene of Lyme-Regis, Dorsetshire.
Purchased, 1871.

M. 2549. Two worn fragments of first (?) upper true molars; from Barrington. *Purchased*, 1885.

32539. The first right upper true molar; from the Pleistocene of Champagne, France. Noticed by Leith-Adams, *op. cit.* p. 24. *Tesson Collection. Purchased*, 1873.

27906 x. The first right upper true molar; from the Pleistocene of Clacton, Essex. This specimen is in an early stage of wear, and shows eleven ridges and talons; it is noticed by Leith-Adams, *op. cit.* p. 23.
Presented by John Brown, Esq., 1852.

47713. The nearly perfect first right upper true molar, in a comparatively early stage of wear; from the Pleistocene of Europa Point, Gibraltar. This specimen (which closely resembles No. M. 362) is noticed by J. Smith in his 'Newer Pliocene Geology,' p. 110 (1862), and by Busk in the Trans. Zool. Soc. vol. x. p. 128 (erroneously as m. 3). Ten perfect ridges and the posterior half of the first ridge remain. *Brome Collection. Presented*, 1876.

49451. An imperfect first or second upper true molar; from the eastern coast. *Purchased*, 1878.

21666. A much-worn second (?) upper true molar; from Grays. Only seven ridges remain. *Purchased*, 1848.

22017. A second upper true molar, in an early stage of wear; from Grays. Noticed by Leith-Adams, *op. cit.* p. 28. *Purchased*, 1848.

22017 x. (*Fig.*) The second right upper true molar, in a rather more worn condition; from Grays. Described and figured by Leith-Adams, *op. cit.* p. 27, pl. iv. fig. 2. *Purchased*, 1848.

22017 y. A well-worn second upper true molar; from Grays. *Purchased*, 1848.

M. 461. A partially-worn second upper true molar; from the Pleistocene of Lippe, Westphalia. *Enniskillen Collection. Purchased*, 1882.

23717*. (*Fig.*) The germ of the second right upper true molar, with the summits of the first and second ridges touched by wear; from the Pleistocene of Slade Green, Erith, Kent. Described and figured by Leith-Adams, *op. cit.* p. 27, pl. ii. fig. 1. *Purchased*, 1849.

33371. An imperfect second (?) upper true molar; dredged off Happisburgh. *Layton Collection. Purchased*, 1858.

40789. An imperfect second or third upper true molar, in a very early stage of wear; from Ilford, Essex. This specimen, from which a large amount of cement has weathered away, is a very typical example of the narrow-crowned variety. *Presented by C. Falconer, Esq.*, 1867.

44132. The greater portion of a half-worn second or third upper true molar of the broad-crowned variety; from the Via Appia, Rome. Noticed by Leith-Adams, *op. cit.* p. 42. *Presented by — Emerson, Esq.*, 1873.

47120–1. (*Fig.*) The right and left third upper true molars, apparently belonging to the same individual; from the Pleistocene of Peterborough, Northamptonshire. Both teeth are somewhat imperfect and about one-third worn; they are both described by Leith-Adams, *op. cit.* p. 34, the left one being also figured by him in pl. ii. figs. 3, 3 *a*. The enamel is much plicated, the middle of each ridge being angulated and the crown broad. *Sharp Collection. Purchased*, 1876.

40989. The third right upper true molar, about one-third worn; (*Fig.*) from the Pleistocene of Kent. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xii. D. figs. 5, 5 *a*.

Presented by the Trustees of the Canterbury Museum, 1865.

33327. The right third upper true molar, about one-third worn; dredged off Happisburgh. Noticed by Leith-Adams, *op. cit.* p. 37 (as a lower molar).

Layton Collection. Purchased, 1858.

16229. The third right upper true molar; from the Forest-bed of (*Fig.*) Ostend, Norfolk. The specimen is about one-third worn, and is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. A. figs. 5, 5 *a*, and noticed by Leith-Adams, *op. cit.* p. 32.

Green Collection. Purchased, 1843.

27907. The third right upper true molar, in a middle stage of wear; from Clacton. This specimen is noticed by Leith-Adams, *op. cit.* p. 37 (as belonging to the left side); and is remarkable for the flattening of the outer surface and the height of the ridges, approaching in the latter respect some molars of *E. primigenius*.

Presented by John Brown, Esq., 1852.

27907 a. The third right upper true molar, in a half-worn condition; (*Fig.*) from Clacton. This very typical specimen of the broad-crowned variety with closely packed ridges is described and figured by Leith-Adams, *op. cit.* p. 32, pl. v. fig. 1.

Presented by John Brown, Esq., 1852.

48426. The third right upper true molar, in a partially worn condition; from the Pleistocene of Weimar.

Presented by C. Westendarp, Esq., 1884.

45192. The third right upper true molar; from Ilford.

Brady Collection. Purchased, 1878.

M. 1577. The third left upper true molar, in nearly the same stage of wear; from the Pleistocene of Weimar.

Presented by C. Westendarp, Esq., 1884.

23118. The third left upper true molar, about one third worn; from (*Fig.*) Grays. Described and figured by Leith-Adams, *op. cit.* p. 33, pl. ii. fig. 2 (as No. 28118). *Purchased*, 1849.

45818. A third left upper true molar, probably belonging to this species; from Chatham, Kent.

Brady Collection. Purchased, 1878.

27915. The third left upper true molar, rather more than half-worn; from Walton, Essex. Noticed by Leith-Adams, *op. cit.* p. 38 (as No. 27515).

Presented by John Brown, Esq., 1852

37271. An imperfect third left upper true molar; from the Pleistocene of Walton. This specimen is in an early stage of wear, and is noticed by Leith-Adams, *op. cit.* p. 37; it is intermediate between the broad- and narrow-crowned varieties. *Brown Collection.*

Presented by Prof. Sir R. Owen, K.C.B., 1859.

37285. A small and deformed third upper true molar; from Clacton. Noticed by Leith-Adams, *op. cit.* p. 37.

Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

15923. The third left upper true molar; from the Forest-bed of Ostend. This specimen is noticed by Leith-Adams, *op. cit.* p. 40; and is remarkable for the number and height of the ridges. *Green Collection. Purchased*, 1843.

40385. A partially-worn third left upper true molar, imperfect anteriorly; from the Pleistocene of Oundle, Northamptonshire. Noticed by Leith-Adams, *op. cit.* pp. 37–38; it belongs to the broad-crowned variety, and by the wearing away of the enamel exhibits the vertical grooving of the enamel. *Presented by G. M. Edmonds, Esq.*, 1867.

27 (O. C.) Fragment of the base of an incisor, transversely bisected; from the Pleistocene of the Via Appia, Rome.

Gualteri[1] *Collection. Purchased, before* 1836.

40873. Fragment of the proximal half of an incisor; from the Anapus, Syracuse, Sicily. *Presented by Dr. Burra*, 1859.

45199. An incisor, provisionally referred to this species; from Ilford. Noticed by Leith-Adams, *op. cit.* p. 231, where it is suggested that it may belong to *E. primigenius*.

Brady Collection. Purchased, 1878.

33796. The anterior portion of the mandible containing the half-worn $\overline{\text{m. 3}}$ of either side; from Barrow-on-Soar, Leicestershire. Noticed by Leith-Adams, *op. cit.* p. 38; the crowns of the teeth are broad. *Purchased*, 1859.

[1] Misspelt Gualteris in preceding Part.

33366. Part of the symphysis and left ramus of the mandible, containing the half-worn $\overline{\text{m. 2}}$; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

18789 b. (*Fig.*) The greater part of the mandible, showing the half-worn $\overline{\text{m. 1}}$ of either side; locality unknown. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiii. A. figs. 5, 5 *a*, and noticed by Leith-Adams, *op. cit.* p. 21. *Presented by the Earl of Aylesford*, 1845.

33367. Fragment of the right ramus of the mandible containing $\overline{\text{m. 3}}$, about one-third worn; dredged off Happisburgh. Noticed by Leith-Adams, *op. cit.* p. 40.
Layton Collection. Purchased, 1858.

40840. Part of the left ramus of the mandible, with $\overline{\text{m. 3}}$ about one-third worn; dredged off the coast of Norfolk. Noticed by Leith-Adams, *op. cit.* p. 40. The crown is of medium width. *Presented by C. Falconer, Esq.*, 1867.

33337. Part of the left ramus of the mandible, showing the half-worn $\overline{\text{m. 3}}$; dredged off Happisburgh. The tooth is of moderate width, and when complete did not probably carry more than eighteen ridges. Noticed by Leith-Adams, *op. cit.* p. 38. *Layton Collection. Purchased*, 1858.

M. 2007. (*Fig.*) Part of the right ramus of the mandible containing portions of $\overline{\text{m. 2}}$ and $\overline{\text{m. 3}}$; from the Pleistocene of Rome. The specimen is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. A. figs. 9, 9 *a*, and is noticed by Leith-Adams, *op. cit.* p. 42. The third molar has been vertically and longitudinally bisected, and the crowns are broad and the ridges thick.
Gualteri Collection. Purchased, before 1836.

28114. (*Fig.*) Part of the right ramus of the mandible, containing $\overline{\text{m. 2}}$; from the Pleistocene of Selsey, Bracklesham Bay, Sussex. Figured in Dixon's 'Geology of Sussex,' p. 16, figs. 1, 2 (1850); and noticed by Leith-Adams, *op. cit.* p. 29. The tooth is about one-third worn, and is very narrow with thin ridges. *Dixon Collection. Purchased*, 1853.

M. 2006. (*Fig.*) Part of the left ramus of the mandible, containing the half-worn $\overline{\text{m. 2}}$; locality unknown. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xii. D. figs. 4, 4 *a*. *No history.*

18967. (*Fig.*) Fragment of the right ramus of the mandible, containing the well-worn $\overline{\text{m. 1}}$ or $\overline{\text{m. 2}}$; from Grays. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. A. figs. 8, 8 *a*, and noticed by Leith-Adams, *op. cit.* p. 22. *Purchased*, 1846.

21310. (*Fig.*) The symphysis and part of the left ramus of the mandible of a very young individual, showing $\overline{\text{mm. 3}}$ in an early stage of wear; from Ilford. Described and figured by Leith-Adams, *op. cit.* p. 14, pl. v. fig. 2, and noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 178. The alveoli for the fangs of $\overline{\text{mm. 2}}$ and for the germ of $\overline{\text{mm. 4}}$ are also shown. *Purchased*, 1847.

18810 b. (*Fig.*) The third right lower milk-molar, about one-third worn; from Grays. This specimen is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. figs. 1, 1 *a* (reversed), and is noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 178; it is also described and figured by Leith-Adams, *op. cit.* p. 13, pl. i. fig. 3. This and the next specimen not improbably belong to the same individual as the upper teeth Nos. 18810, 18810 *a*. *Purchased*, 1845.

18810 c. (*Fig.*) The third left lower milk-molar, belonging to the same individual as the preceding specimen, which has been longitudinally and vertically bisected. Figured by Falconer and Cautley, *op. cit.* pl. xiv. fig. 1 *b* (described as identical with the preceding). *Purchased*, 1845.

21655. The third left lower milk-molar, in an early stage of wear; from Grays. Noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 178, and by Leith-Adams, *op. cit.* p. 13. This and the following specimen are larger than the two preceding ones. *Purchased*, 1848.

47408. The third left lower milk-molar, in an early stage of wear; from Grays. Noticed by Leith-Adams, *op. cit.* p. 14 (as No. 47407). The cement has been worn away. *Presented by C. Falconer, Esq.*, 1867.

42329. A third lower milk-molar; from Kirkdale Cave, Yorkshire. *Purchased*, 1870. (*Originally in Dr. Buckland's Collection.*)

74 a (O. C.). The third left lower milk-molar; from Kirkdale Cave. This specimen is larger than the preceding, both being about one-third worn. *Presented by W. Salmond, Esq. Before* 1836.

M. 2548. A tooth which is probably a small example of the fourth right lower milk-molar ; from Barrington, Cambridgeshire. There are nine ridges, of which the last is just touched by wear. *Purchased*, 1885.

44735. A larger example of the fourth right lower milk-molar, in an early stage of wear ; from Hutton Cave, Mendip Hills. There are eleven ridges and talons.
Presented by B. Bright, Esq., 1873.

44781. A still larger example of the fourth right lower milk-molar, about one-third worn ; locality unknown. Noticed by Leith-Adams, *op. cit.* p. 17.
Presented by B. Bright, Esq., 1873.

33374. The fourth left lower milk-molar, in an early stage of wear ; dredged off Happisburgh. Noticed by Leith-Adams, *op. cit.* p. 17 ; it has eleven ridges and two talons, the ridges being very narrow. *Layton Collection. Purchased*, 1858.

33375. The fourth left lower milk-molar ; dredged off Happisburgh. Noticed by Leith-Adams, *op. cit.* p. 17.
Layton Collection. Purchased, 1858.

33388. The fourth right lower milk-molar, in an early stage of wear ; dredged off Happisburgh. Noticed by Leith-Adams, *op. cit.* p. 17 [1].
Layton Collection. Purchased, 1858.

33389. An imperfect half-worn fourth right lower milk-molar ; dredged off Happisburgh. Noticed by Leith-Adams, *op. cit.* p. 18 ; the ridges are relatively broad.
Layton Collection. Purchased, 1858.

40991. (*Fig.*) The fourth right lower milk-molar, in a much-worn condition ; from the Pleistocene of Kent. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. A. figs. 7, 7 *a*.
Presented by the Trustees of the Canterbury Museum, 1865.

46936. A much-worn fourth left lower milk-molar, provisionally referred to this species ; from the Pleistocene (? Forest-bed) of the Norfolk Coast. *Purchased*, 1876.

[1] In this notice the specimen is stated to have 19 (in place of 9) ridges.

18811. An imperfect fourth left lower milk-molar in an early stage of wear; from the Pleistocene of Grays.
Purchased, 1845.

40386. The imperfect first right lower true molar in a half-worn condition; from Oundle. The ridges are broad and wide apart, and the loss of part of the cement shows the characteristic vertical grooving of the enamel.
Presented by G. M. Edmonds, Esq., 1867.

45195. Hinder portion of a half-worn second lower true molar; from Ilford. *Brady Collection. Purchased*, 1878.

18966. (*Fig.*) Portion of a well-worn second left lower true molar of the broad-crowned variety; from Grays. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. fig. 6 (as *E. priscus*), and described in 'Falconer's Palæontological Memoirs,' vol. ii. p. 98. *Purchased*, 1845.

39370. (*Fig.*) The second left lower true molar, which has been longitudinally and vertically bisected; from Grays. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. figs. 7, 7 *a*, 7 *b*, and described and figured in 'Falconer's Palæontological Memoirs,' vol. ii. p. 96, pl. vii. figs. 1, 2 (as *E. priscus*). This specimen was found previously to 1845, and appears to have belonged to a nearly complete skeleton. *Purchased. Before* 1845.

33351, 33381. Two worn and imperfect first or second lower true molars, provisionally referred to this species; dredged off Happisburgh. *Layton Collection. Purchased*, 1858.

33373. The second right lower true molar, in an early stage of wear; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

19844. (*Fig.*) The second right lower true molar, in a very early stage of wear; from the Pleistocene of Slade Green, Erith, Kent. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. A. figs. 10, 10 *a*, and noticed by Leith-Adams, *op. cit.* p. 28. *Purchased*, 1846.

20809 a. The imperfect second right lower true molar, in an early stage of wear; from Ilford. Noticed by Leith-Adams, *op. cit.* p. 29. *Purchased*, 1847.

22017 b. The well-worn second right lower true molar; from Grays. This is a very characteristic specimen of the narrow-crowned variety. *Purchased*, 1848.

22017 a. A very similar specimen of the homologous tooth of the opposite side; from Grays. *Purchased*, 1848.

M. 2549 b. An imperfect second lower true molar; from Barrington. *Purchased*, 1885.

18966 a. Fragment of a much-worn second (?) lower true molar; from Grays. Five ridges remain, which are unusually broad. *Purchased*, 1845.

31318. The second left lower true molar, in a half-worn and somewhat imperfect condition; from Grays. There are twelve ridges. *Purchased*, 1847.

27906. The second left lower true molar, in an early stage of wear; from Clacton. *Presented by John Brown, Esq.*, 1852.

42349. Hinder portion of the partially-worn second right lower true molar; from the Pleistocene of the Thames Valley. Noticed by Leith-Adams, *op. cit.* p. 33. *Purchased*, 1870.

27908. The associated right and left third lower true molars, in a half-worn condition, and wanting some of the hinder ridges; from the Pleistocene of St. Mary's Stoke, near Ipswich, Suffolk. These specimens, which belong to the broad-crowned variety, are noticed by Leith-Adams, *op. cit.* p. 38, where they are erroneously stated to be implanted in the mandible.
Presented by John Brown, Esq., 1852.

47119. (*Fig.*) The associated right and left third lower true molars, in a comparatively early stage of wear and wanting some of the hinder ridges; from the Forest-bed of Cromer, Norfolk. Described and (one) figured by Leith-Adams, *op. cit.* p. 34, pl. iii. figs. 1, 1 *a*. These specimens belong to the thick-ridged variety. *Sharp Collection. Purchased*, 1876.

39464. (*Fig.*) The partially-worn third right lower true molar, with one or more of the anterior ridges worn away; from the Pleistocene of Saffron Walden, Essex. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. A. figs. 11, 11 *a*, and in 'Falconer's Palæontological Memoirs,' vol. ii. pl. ix. figs. 3, 4.
Bowerbank Collection. Purchased, 1865.

23118 a. The hinder part of a half-worn third right lower true molar; from Grays. *Purchased*, 1849.

27909. (*Fig.*) The third right lower true molar; from Clacton. Described and figured by Leith-Adams, *op. cit.* p. 33, pl. iv. figs. 1, 1 *a* (as No. 27907). There are twenty ridges, of which the four last are untouched by wear.
Presented by John Brown, Esq., 1852.

49450. The half-worn and imperfect third right lower true molar, with a very broad crown; from the eastern coast (probably Walton). *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1852.

45193. Fragment of the middle of the third right lower true molar, in an early stage of wear; associated with No. 45192 (page 128). *Brady Collection. Purchased*, 1878.

33336. The imperfect third right lower true molar, in an early stage of wear; dredged off Happisburgh.
Layton Collection. Purchased, 1858.

M. 3498. (*Fig.*) The hinder portion of the half-worn third left lower true molar; dredged off Happisburgh. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. A. fig. 12, and noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 164, and by Leith-Adams, *op. cit.* pp. 32, 33. *No history.*

39463. The hinder portion of the half-worn third left lower true molar; from the Pleistocene of Southwold, Suffolk. This specimen is noticed by Leith-Adams, *op. cit.* p. 38; it belongs to the broad-crowned variety, and in its closely-packed ridges approximates to *E. primigenius.*
Bowerbank Collection. Purchased, 1865.

8 (O. C.). (*Fig.*) The half-worn third left lower true molar, imperfect anteriorly; from the Pleistocene of the Via Appia, Rome. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. A. figs. 13, 13 *a*, and in 'Falconer's Palæontological Memoirs,' vol. ii. pl. ix. fig. 5; and noticed by Leith-Adams, *op. cit.* pp. 42, 43.
Gualteri Collection. Purchased, before 1836.

45194. The third left lower true molar, in an early stage of wear, and wanting one or two ridges; from Ilford. Eighteen ridges remain. *Brady Collection. Purchased*, 1878.

21680. The glenoidal extremity of the left scapula; from Grays. *Purchased*, 1848.

23151. The imperfect right humerus of a very large individual; from Grays. *Purchased*, 1848.

33396. The distal portion of the left humerus; from Happisburgh beach. *Layton Collection. Purchased*, 1858.

33 (O. C.). The distal epiphysis of a radius; from the Via Appia. *Gualteri Collection. Purchased, before* 1836.

45106, 45204. Two radii of opposite sides; from Ilford. Noticed by Leith-Adams, *op. cit.* p. 59 (as Nos. C. 162 and D. 13). *Brady Collection. Purchased*, 1878.

32 (O. C.). The proximal portion of the left ulna; from the Via Appia. *Gualteri Collection. Purchased, before* 1836.

45203. The proximal half of the right ulna; from Ilford. Noticed by Leith-Adams, *op. cit.* p. 59 (as No. D. 12). *Brady Collection. Purchased*, 1878.

45202. The proximal half of the left ulna; from Ilford. Noticed by Leith-Adams, *op. cit.* p. 59 (as No. D. 11). *Brady Collection. Purchased*, 1878.

19838. The proximal portion of the left ulna; from Grays. *Purchased*, 1846.

18245–8, 18251. (*Fig.*) Five associated bones of the right carpus and metacarpus; from Grays. The third metacarpal is described and figured by Leith-Adams, *op. cit.* p. 234, pl. xviii. fig. 6. *Purchased*, 1844.

18249. The third right metacarpal; from Grays. *Purchased*, 1844.

47126. The right cuneiform; from the Pleistocene of Whittlesea, Cambridgeshire. *Sharp Collection. Purchased*, 1876.

36608. The left cuneiform (imperfect); from Grays. *Purchased*, 1855.

20821*. (*Fig.*) The right trapezium; from Grays. Described and figured by Leith-Adams, *op. cit.* pp. 164, 234, pl. xix. fig. 9. *Purchased*, 1847.

18244. (*Fig.*) The left magnum; from Essex (probably Grays). Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. li. fig. 6. *Purchased*, 1844.

21319. A patella; from Essex (probably Grays). Figured by (*Fig.*) Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. lv. fig. 4, and noticed by Leith-Adams, *op. cit.* p. 63. *Purchased*, 1847.

40134. The left tibia; from the Pleistocene of Camberwell, Surrey. (*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 63 (as No. 48134), pl. xix. fig. 11. *Purchased*, 1866.

47406. The distal extremity of the left fibula; probably from Grays. *No history.*

21322. The imperfect left calcaneum; from Grays. Figured by (*Fig.*) Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. lv. fig. 2, and noticed by Leith-Adams, *op. cit.* p. 64. *Purchased*, 1847.

27940. An immature right calcaneum; from Grays. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* pp. 170, 234, pl. xix. fig. 2. *Presented by John Brown, Esq.*, 1852.

21642. The left navicular; from Grays. Noticed by Leith-Adams, *op. cit.* p. 228. *Purchased*, 1848.

36612, 36613. The right and left mesocuneiform; from Grays. Noticed by Leith-Adams, *op. cit.* p. 172. *Purchased*, 1855.

36609. The left trapezoid; from Grays. Described and figured by (*Fig.*) Leith-Adams, *op. cit.* pp. 161, 234, pl. xxi. fig. 4. *Purchased*, 1855.

23119. The left trapezoid; from the Pleistocene of Maidstone, Kent. *Purchased*, 1849.

21318 a. A sesamoid; from Grays. *Purchased*, 1847.

45200. The atlas vertebra; from Ilford. Described and figured by (*Fig.*) Leith-Adams, *op. cit.* pp. 57, 232, pl. xvii. fig. 2. *Brady Collection. Purchased*, 1878.

45201. The centrum of the axis vertebra; from Ilford. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* p. 232, pl. xvii. fig. 5. *Brady Collection. Purchased*, 1878.

47124. The imperfect centrum of the axis and fragment of the atlas

vertebra; from the Pleistocene near Peterborough. These specimens are of enormous size.

Sharp Collection. Purchased, 1876.

Elephas mnaidriensis, Leith-Adams[1].

This species is considered to have averaged between six and seven feet in height and to have been allied to the narrow-crowned race of *E. antiquus* and also to *E. africanus*. The ridge-formula is given by Leith-Adams[2] (exclusive of talons) as Mm. $\frac{3 . 6 . (8—9)}{3 . 6 . (8—9)}$, M. $\frac{8—9 . 10 . (12—13)}{8—9 . 10 . (12—13)}$, which is lower than in *E. antiquus* and nearer *E. meridionalis*. The form of the disks on the worn ridges of the molars is very similar to those in the narrow-crowned variety of *E. antiquus*; the plication of the enamel is usually less marked than in the next species, and there are both thin- and thick-ridged teeth. There is considerable difficulty in referring many of the earlier teeth to their proper serial position, and it is not always easy to determine whether a tooth which might be regarded as (say) m. 1 of the present species might not be mm. 4 of *E. melitensis*. Many of the serial determinations made by Leith-Adams are provisional[3], and they are in the main followed here with the same proviso. It is probable that there was a complete transition from *E. antiquus* through the present form to *E. melitensis*; and whether the three forms be regarded as distinct species, or merely as races of one or two very variable species, is a matter of individual opinion, and one of comparatively little import[4].

Hab. Malta. All the following specimens (which are the types) are from the Pleistocene cavern and rock-fissure deposits of that island. Unless otherwise stated, they belong to the Leith-Adams Collection, which was purchased in 1873; the majority of these specimens have been described and figured by Leith-Adams in the Trans. Zool. Soc. vol. ix. part 1 (1874).

49212. The left exoccipital; from Zebbug cave. Figured by Busk (*Fig.*) in the Trans. Zool. Soc. vol. vi. pl. xliv. figs. 3, 4 (as *Elephas*, sp.). *Spratt Collection. Presented*, 1874–80.

[1] 'Notes of a Naturalist in the Nile Valley and Malta,' p. 224: Edinburgh, 1870. The name was here given as *E. mnaidræ*, but was amended by its author in the Trans. Zool. Soc. vol. ix. p. 116 (1874).

[2] Trans. Zool. Soc. vol. ix. p. 112.

[3] *Ibid.* pp. 109–111.

[4] See Leith-Adams, *op. cit.* p. 110. Pohlig (Sitz. niederrhein. Ges. Feb. 4th, 1884) proposes to include *E. melitæ* (*sic*), Falc., in *E. antiquus*, and it may be inferred that such inclusion would embrace the present form.

44282. Fragment of the left maxilla, containing m. 1 (?); from
(*Fig.*) Mnaidra gap. Described and figured by Leith-Adams in the Trans. Zool. Soc. vol. ix. p. 22, pl. viii. fig. 5.

44280. Fragment of the right maxilla, containing part of m. 2 and
(*Fig.*) the complete m. 3; from Mnaidra gap. Described and figured, *op. cit.* p. 33, pl. viii. fig. 2.

44233. A third upper milk-molar. Described and figured, *op. cit.*
(*Fig.*) p. 16, pl. i. fig. 13.

44298. An imperfect third upper milk-molar. Noticed, *op. cit.* p. 16 (as No. 97).

44238. An imperfect third upper milk-molar. Noticed, *op. cit.* p. 16 (as No. 89).

44268. An imperfect fourth upper milk-molar. Noticed, *op. cit.* p. 18 (as No. 12).

44299. An imperfect fourth upper milk-molar. Noticed, *op. cit.* p. 21 (as No. 52).

44300. An imperfect fourth upper milk-molar. Noticed, *op. cit.* p. 21 (as No. 13).

44279. The fourth left upper milk-molar, in an early stage of wear;
(*Fig.*) from Mnaidra gap. Described and figured, *op. cit.* p. 21, pl. iii. figs. 4, 4 *a*, 4 *b*.

44273. The fourth left upper milk-molar; from Mnaidra gap.
(*Fig.*) Described and figured, *op. cit.* p. 21, pl. iv. figs. 2, 2 *a*.

44254. A much-worn second upper true molar; from Mnaidra gap.
(*Fig.*) Described and figured, *op. cit.* p. 6, pl. ii. fig. 7.

44275. The well-worn second left upper true molar; from Gandia
(*Fig.*) fissure. Described and figured, *op. cit.* p. 26, pl. iii. fig. 1.

44283. The greater portion of the half-worn second upper true
(*Fig.*) molar; from Mnaidra gap. Described and figured, *op. cit.* p. 26, pl. viii. fig. 4.

44303. A second upper (?) true molar; from Mnaidra gap.

44277. The first left upper true molar; from Gandia fissure.
(*Fig.*) Described and figured, *op. cit.* p. 22, pl. iii. figs. 3, 3 *a*.

44309. Anterior portion of a third upper true molar, in an early stage of wear. Noticed, *op. cit.* p. 34 (as No. 68).

44305. Middle portion of a half-worn third upper true molar, in a broken condition. Noticed, *op. cit.* p. 34 (as No. 78).

44306. (*Fig.*) A third upper true molar, in an early stage of wear; from Mnaidra gap. Described and figured, *op. cit.* p. 33, pl. vii. fig. 1.

44281. (*Fig.*) The third left upper true molar; from Mnaidra gap. Described and figured, *op. cit.* p. 34, pl. viii. figs. 1, 1 *a*.

44287. (*Fig.*) The third left upper true molar, in a very early stage of wear; from Mnaidra gap. Described and figured, *op. cit.* p. 33, pl. viii. fig. 3.

44310. The greater portion of the well-worn third right upper true molar, in a damaged condition. Noticed, *op. cit.* p. 33 (as No. 64).

44319. (*Fig.*) Portion of a large incisor. Described and figured, *op. cit.* p. 9, pl. xi. fig. 11.

44320. Fragment of a large incisor. Noticed, *op. cit.* p. 9 (as No. 2).

44321. (*Fig.*) Portion of a large incisor. Described and figured, *op. cit.* p. 9, pl. xi. fig. 12.

49210. Fragment of an incisor; from Zebbug cave. Noticed by Busk in the Trans. Zool. Soc. vol. vi. p. 233 (as *Elephas*, sp.). *Spratt Collection. Presented*, 1874–78.

44323, 44324. (*Fig.*) The tips of two small incisors. Described and figured by Leith-Adams, *op. cit.* p. 9, pl xi. figs. 14, 15.

49207. (*Fig.*) Symphysis of the mandible; from Zebbug cave. Figured by Busk in the Trans. Zool. Soc. vol. vi. pl. xliv. fig. 1 (as *Elephas*, sp.). *Spratt Collection. Presented*, 1874–78.

44236. (*Fig.*) Cast of the symphysis and part of the right ramus of the mandible, containing the well-worn $\overline{\text{mm. 3}}$ (?). The original is described and figured by Leith-Adams, *op. cit.* pp. 16, 38, pl. i. fig. 12, and pl. vi. fig. 2.

44311. Part of a mandible, containing the greater portion of mm. 4 and $\overline{\text{m. 1}}$, in a damaged condition; from Mnaidra gap.

44217. Fragment of a mandibular ramus, containing part of the germ of $\overline{m.2}$; from Mnaidra gap. Noticed, *op. cit.* pp. 44, 45 (as No. 107).

44291. (*Fig.*) Fragment of the left ramus of the mandible, containing $\overline{m\,|\,2}$; from Benghisa gap. Described and figured, *op. cit.* p. 25, pl. xi. figs. 10, 10 *a*.

44234. (*Fig.*) The third left lower milk-molar. Described and figured, *op. cit.* p. 16, pl. i. fig. 16 (described in text as an upper tooth).

44227. (*Fig.*) A small specimen of the third lower milk-molar. Described and figured, *op. cit.* p. 15, pl. i. fig. 9. The specific reference is provisional.

44230. (*Fig.*) A slightly-worn third lower milk-molar. Described and figured, *op. cit.* p. 16, pl. i. fig. 15.

44241–43–44–47. Four specimens of the third lower milk-molar. Noticed, *op. cit.* p. 15 (as Nos. 3, 4, 6, 10).

44295–97. Three specimens of the third lower milk-molar. Noticed, *op. cit.* p. 16 (as Nos. 76, 77, 82).

44301. A fourth lower milk-molar, about one-third worn. Noticed, *op. cit.* p. 22 (as No. 63).

44278. (*Fig.*) A half-worn fourth lower milk-molar; from Mnaidra gap. Described and figured, *op. cit.* p. 21, pl. iii. figs. 5, 5 *a*.

44276. (*Fig.*) The middle portion of a half-worn second lower true molar; from Mnaidra gap. Described and figured, *op. cit.* p. 27, pl. iii. fig. 2.

44273. (*Fig.*) The half-worn second right lower true molar; from Gandia fissure. Described and figured, *op. cit.* p. 22, pl. iv. fig. 4.

44274. (*Fig.*) The second left lower true molar; from Mnaidra gap. Described and figured, *op. cit.* p. 22, pl. iv. fig. 5.

44315. Fragment of a worn second lower true molar; from Mnaidra gap. Noticed, *op. cit.* p. 27 (as No. 81 *b*).

44284. (*Fig.*) Hinder portion of a half-worn third lower true molar of large size; from Mnaidra gap. Described and figured, *op. cit.* p. 34, pl. viii. fig. 7.

44242. A little-worn third lower milk-molar. Described, *op. cit.* p. 15 (as No. 62); it is practically indistinguishable from No. 44250, which Leith-Adams regards as $\overline{\text{mm.}}\,3$ of *E. melitensis*.

44232. (*Fig.*) A third lower milk-molar; from Mnaidra gap. Described and figured, *op. cit.* p. 16, pl. i. fig. 14.

44308. The half-worn third right lower true molar; from Mnaidra gap. Noticed, *op. cit.* p. 34 (as No. 36).

44285–6. (*Fig.*) The associated right and left third lower true molars; from Benghisa gap. Described and figured, *op. cit.* p. 32, pl. viii. fig. 9.

44292. The third right lower true molar, about one-third worn, in a fractured condition. Noticed, *op. cit.* p. 25 (as No. 42).

44288. (*Fig.*) The third right lower true molar, in an early stage of wear; from Mnaidra gap. Described and figured, *op. cit.* p. 33, pl. viii. figs. 8, 8 *a*.

44304. (*Fig.*) The third right lower true molar, about one-third worn; from Mnaidra gap. Described and figured, *op. cit.* p. 33, pl. vii. figs. 2, 2 *a*. The crown is remarkable for its excessive lateral curvature.

44308. The third left lower true molar, about one-third worn; from Mnaidra gap.

44270. Detached ridge of a milk-molar.

44302. Seven ridges of an unworn true molar.

44314. Fragment of a second or third true molar.

44380. (*Fig.*) Part of the glenoidal extremity of a scapula; from Mnaidra gap. Described and figured, *op. cit.* p. 52, pl. xi. fig. 3.

44379. (*Fig.*) The head of a humerus; from Mnaidra gap. Described and figured, *op. cit.* p. 52, pl. xi. fig. 2.

44377. (*Fig.*) The head and part of the shaft of a humerus; from Mnaidra gap. Described and figured, *op. cit.* p. 51, pl. xi. fig. 1.

44381. The head of a smaller humerus.

44383. (*Fig.*) The proximal extremity of an immature radius; from Mnaidra gap. Described and figured, *op. cit.* p. 54, pl. x. figs. 7, 7 *a*.

44217 a. The proximal extremity of an immature radius. Noticed, *op. cit.* p. 54.

44384. The distal epiphysis of the right radius; from Mnaidra gap. (*Fig.*) Described and figured, *op. cit.* p. 55, pl. x. fig. 6.

44385. The distal epiphysis of a smaller right radius. Noticed, *op. cit.* p. 55.

44440 a. The distal extremity of a radius.

44386. The distal epiphysis of the left radius. Noticed, *op. cit.* p. 55.

44390. The left scaphoid; from Gandia fissure. Described and (*Fig.*) figured, *op. cit.* p. 66, pl. xvii. fig. 10.

44391. The left lunar; from Mnaidra gap. Described and figured, (*Fig.*) *op. cit.* p. 68, pl. xviii. fig. 1.

44392 a. The right lunar; from Benghisa gap. Noticed, *op. cit.* p. 68.

44392. The right cuneiform; from Gandia fissure. Described and (*Fig.*) figured, *op. cit.* p. 69, pl. xviii. fig. 2.

44393. The left cuneiform; from Gandia fissure. Described and (*Fig.*) figured, *op. cit.* p. 69, pl. xviii. fig. 5.

44394. The left magnum; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 72, pl. xvii. fig. 13.

44395. The right magnum. Noticed, *op. cit.* p. 72.

44217 b. The left unciform; from Gandia fissure. Noticed, *op. cit.* p. 69, as the right cuneiform (? *E. melitensis*).

44397. The left unciform.

44398. The left unciform.

44399. The right unciform; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 73, pl. xvii. fig. 12.

44400. The left pisiform; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 71, pl. xviii. fig. 3.

44401. The right pisiform; from Mnaidra gap. Noticed, *op. cit.* p. 71.

44528. Three sesamoids. Described and figured, *op. cit.* p. 107, (*Fig.*) pl. xx. figs. 18–20.

44493, 44525. The left first metacarpal and associated phalangeal; (*Fig.*) from Mnaidra gap. Described and figured, *op. cit.* p. 90, pl. xix. fig. 2.

44411. The right third metacarpal; from Mnaidra gap. Described (*Fig.*) and figured, *op. cit.* p. 95, pl. xix. fig. 10.

44413. The right fourth metacarpal. Described and figured, *op.* (*Fig.*) *cit.* p. 98, fig. 8. no. 1.

44415. The left fourth metacarpal, imperfect proximally. De- (*Fig.*) scribed and figured, *op. cit.* p. 98, fig. 8. no. 2.

44416. The right fifth metacarpal; from Mnaidra gap. Described (*Fig.*) and figured, *op. cit.* p. 103, pl. xix. fig. 11.

44417. The right fifth metacarpal. Noticed, *op. cit.* p. 103.

44526. The third phalangeal of the first digit of the manus; from (*Fig.*) Mnaidra gap. Described and figured, *op. cit.* p. 90, pl. xix. fig. 5.

44510–17. The first and second phalangeals of the second digit of (*Fig.*) the left manus; from Mnaidra gap. Described and figured, *op. cit.* p. 91, pl. xx. fig. 2.

44497–513. The three phalangeals of the third digit of the left (*Fig.*) manus. Described and figured, *op. cit.* p. 96, pl. xx. fig. 8.

44504–16. The three phalangeals of the fourth digit of the left (*Fig.*) manus, belonging to the same individual as the preceding specimens. Described and figured, *op. cit.* p. 101, pl. xx. fig. 9.

44500. The first phalangeal of the fourth digit of the right manus; (*Fig.*) from Mnaidra gap. Described and figured, *op. cit.* p. 101, pl. xx. fig. 13.

44527. A first and second phalangeal, provisionally referred to the (*Fig.*) fourth digit of the manus. Described and figured, *op. cit.* p. 101, pl. xx. fig. 15.

44509. The proximal phalangeal of the fifth digit of the manus. (*Fig.*) Described and figured, *op. cit.* pp. 103, 105, fig. 9. no. 4.

44524. The third phalangeal of the fifth digit of the left manus (?); (*Fig.*) from Mnaidra gap. Described and figured, *op. cit.* p. 105, pl. xix. fig. 14; the specific reference is provisional.

46213. The shaft of the immature left femur; from Zebbug cave. (*Fig.*) Figured by Busk in the 'Trans. Zool. Soc.' vol. vi. pl. xlv. fig. 5 (as *Elephas*, sp.).
Spratt Collection. Presented, 1874–78.

44434. Part of the head of a femur. Described and figured by (*Fig.*) Leith-Adams, *op. cit.* p. 58, pl. xi. fig. 5.

44432. The left femur, wanting the distal extremity; from Mnaidra (*Fig.*) gap. Described and figured, *op. cit.* p. 58, pl. xiv. fig. 1.

44436. The head of a femur.

44433. The distal extremity of the right femur belonging to the (*Fig.*) same individual as No. 44432. Described and figured, *op. cit.* p. 59, pl. xiv. figs. 2, 2 *a*.

44435. The distal portion of the right femur; from Mnaidra gap. (*Fig.*) Described and figured, *op. cit.* p. 58, pl. xi. fig. 6.

44559. The distal portion of the shaft of an immature left femur. Noticed, *op. cit.* p. 61.

44444. The left patella; from Mnaidra gap. Described and figured, (*Fig.*) *op. cit.* p. 65, pl. xv. fig. 8.

44445. The right patella; from Mnaidra gap. Described and figured, (*Fig.*) *op. cit.* p. 65, pl. xv. fig. 7.

44447–8. Two specimens of the patella.

44438. The left tibia; from Mnaidra gap. Described and figured, (*Fig.*) *op. cit.* p. 61, pl. xv. fig. 1.

44440. The proximal half of the right tibia; from Mnaidra gap. (*Fig.*) Described and figured, *op. cit.* p. 61, pl. xv. fig. 3.

44437. The distal extremity of the left tibia; from Mnaidra gap. (*Fig.*) Described and figured, *op. cit.* p. 62, pl. xv. figs. 2, 2 *a*, where it is referred to the right side.

44441. The distal extremity of a fibula; from Mnaidra gap. De- (*Fig.*) scribed and figured, *op. cit.* p. 64, pl. xv. fig. 4.

44455. The right calcaneum; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 82, pl. xvi. fig. 4.

44439. The left astragalus; from Mnaidra gap. Noticed, *op. cit.* p. 79.

44449. The left astragalus; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 79, pl. xvi. fig. 2.

44450. The right astragalus; from Mnaidra gap. Noticed, *op. cit.* p. 79.

44453. The right astragalus; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 79, pl. xvi. fig. 1.

44454. Portion of an astragalus; from Gandia fissure. Noticed, *op. cit.* p. 79.

44457. The immature right navicular; from Mnaidra gap. De- (*Fig.*) scribed and figured, *op. cit.* p. 83, pl. xvii. fig. 7.

44458. The left navicular; from Mnaidra gap. Noticed, *op. cit.* p. 83.

44459. The right navicular; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 83, pl. xvii. fig. 1.

44460. The left navicular; from Mnaidra gap. Noticed, *op. cit.* p. 83.

44465. The right cuboid; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 84, pl. xvii. fig. 4.

44463–4. The right and left ectocuneiform; from Mnaidra gap. (*Fig.*) No. 44464 is described and figured, *op. cit.* p. 86, pl. xvii. fig. 2.

44471. A mesocuneiform; from Mnaidra gap. Described and (*Fig.*) figured, *op. cit.* p. 87, pl. xvii. fig. 3.

44461. The left entocuneiform; from Gandia fissure. Described (*Fig.*) and figured, *op. cit.* p. 89, pl. xix. fig. 1.

44462. An entocuneiform.

44494. The left first metatarsal, with the first phalangeal; from (*Fig.*) Mnaidra gap. Described and figured, *op. cit.* p. 91, pl. xx. figs. 1, 1 *a*, 1 *b*.

44475. The right fourth metatarsal; from Mnaidra gap. Described (*Fig.*) and figured, *op. cit.* p. 99, pl. xx. fig. 4.

44421. The left fifth metatarsal; from Mnaidra gap. Described (*Fig.*) and figured, *op. cit.* p. 104, pl. xx. fig. 7.

44522. The first phalangeal of the fifth digit of the left pes; from (*Fig.*) Mnaidra gap. Described and figured, *op. cit.* p. 106, pl. xix. fig. 13.

44501. The first phalangeal of the fifth digit of the left pes; from
(*Fig.*) Mnaidra gap. Described and figured, *op. cit.* p. 104, pl. xx. fig. 10.

44334. The centra of the third and fourth cervical vertebræ; from
(*Fig.*) Mnaidra gap. Described and figured, *op. cit.* p. 48, pl. xi. fig. 7. These specimens belonged to the same individual as the femur (No. 44435) represented in fig. 6 of the same plate.

44335. Three imperfect middle dorsal vertebræ of the same
(*Fig.*) individual; from Mnaidra gap. Described and figured, *op. cit.* p. 48, pl. xi. fig. 8.

44343. The imperfect first dorsal vertebra; from Mnaidra gap.
(*Fig.*) Described and figured, *op. cit.* p. 48, pl. x. fig. 1.

44344. The centrum of a middle (? ninth) dorsal vertebra; from
(*Fig.*) Mnaidra gap. Described and figured, *op. cit.* p. 48, pl. x. fig. 4.

49209. Neural spine of a dorsal vertebra; from Zebbug cave.
(*Fig.*) Figured by Busk in the 'Trans. Zool. Soc.' vol. vi. pl. xliv. fig. 2 (as *Elephas*, sp.).
Spratt Collection. Presented, 1874–78.

44345–9–50. Three imperfect dorsal vertebræ.

44352–3. The centra of two caudal vertebræ.

44363. The head of a (fifth?) rib; from Mnaidra gap. Described
(*Fig.*) and figured by Leith-Adams, *op. cit.* p. 48, pl. x. fig. 2.

44364. The head of a rib; from Mnaidra gap.

44365. The head of a rib; from Mnaidra gap. Described and
(*Fig.*) figured, *op. cit.* p. 48, pl. x. fig. 3.

The following specimens, which were likewise obtained from the caverns and rock-fissures of Malta, belong either to this or the next species.

49277. An immature right exoccipital; from Zebbug cave. De-
(*Fig.*) scribed and figured by Busk in the 'Trans. Zool. Soc.' vol. vi. p. 272, pl. lii. figs. 42′, 42′*a*.
Spratt Collection. Presented, 1874–78.

49278. An immature left exoccipital; from Zebbug cave. De-
(*Fig.*) scribed and figured by Busk, *op. cit.* p. 273, pl. lii. figs. 44, 44 *a*. *Spratt Collection. Presented*, 1874–78.

49279. An immature right exoccipital; from Zebbug cave. Noticed by Busk, *op. cit.* p. 272.
Spratt Collection. Presented, 1874–78.

49313. Numerous fragments of the cranium; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

49284. Fragment of a premaxilla with the incisor; from Zebbug (*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 276, pl. lii. fig. 46. *Spratt Collection. Presented*, 1874–78.

49313 a. Fragment of the petrosal region; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

44221–4. Four specimens of the second milk-molar. Described (*Fig.*) and figured by Leith-Adams in the 'Trans. Zool. Soc.' vol. ix. pp. 11, 12, pl. i. figs. 3–6.
Leith-Adams Collection. Purchased, 1873.

44240. A third or fourth upper milk-molar.
Leith-Adams Collection. Purchased, 1873.

49293–6. Four imperfect germs of milk-molars; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

49297. Several detached ridges of molars; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

44257–8. Two detached ridges of molars. Described and figured (*Fig.*) by Leith-Adams, *op. cit.* p. 5, pl. ii. figs. 4, 5.
Leith-Adams Collection. Purchased, 1873.

44269. A partially-worn ridge of a molar.
Leith-Adams Collection. Purchased, 1873.

44255. Portions of two ridges of a molar, split vertically in the (*Fig.*) long axis of the crown. Described and figured by Leith-Adams, *op. cit.* p. 6, pl. ii. fig. 6.
Leith-Adams Collection. Purchased, 1873.

44256. An unworn ridge of a molar. Described and figured by (*Fig.*) Leith-Adams, *op. cit.* p. 5, pl. ii. figs. 3, 3 *a*.
Leith-Adams Collection. Purchased, 1873.

49314–7. Several fragments of incisors; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

49211. Several abraded fragments of incisors; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

44325–7. Three portions of incisors. Described and figured by (*Fig.*) Leith-Adams, *op. cit.* p. 9, pl. xi. figs. 16–18.
Leith-Adams Collection. Purchased, 1873.

49291. Fragment of an immature left mandibular ramus; from Zebbug cave. *Spratt Collection. Presented*, 1874–78.

49280. Part of an immature right mandibular ramus; from Zebbug (*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 278, pl. lii. figs. 42, 42 *a*.
Spratt Collection. Presented, 1874–78.

49281. Part of an immature left mandibular ramus; from Zebbug cave. *Spratt Collection. Presented*, 1874–78.

49282. The anterior portion of the mandible of a very young (*Fig.*) individual; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 278, pl. lii. fig. 45.
Spratt Collection. Presented, 1874–78.

49283. Part of an immature right mandibular ramus; from Zebbug (*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 278, pl. lii. fig. 43. *Spratt Collection. Presented*, 1874–78.

49214. Fragment of a mandibular ramus; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

49206 c. A very much worn lower molar; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

44374. Fragment of an immature scapula; from Mnaidra gap. (*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 53, pl. ix. figs. 5, 5 *a*. There are doubts whether this specimen really belongs to the Proboscidea.
Leith-Adams Collection. Purchased, 1873.

44537. The glenoidal extremity of an immature scapula; from (*Fig.*) Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 53, pl. xxi. fig. 8.
Leith-Adams Collection. Purchased, 1873.

44538. The shaft of an immature humerus: from Benghisa gap. (*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 53, pl. xxi. figs. 9, 9 *a*; this specimen belongs to the same individual as No. 44537.
Leith-Adams Collection. Purchased, 1873.

44565. The proximal portion of the shaft of an immature humerus.
Leith-Adams Collection. Purchased, 1873.

44558. The distal portion of the shaft of an immature humerus.
Leith-Adams Collection. Purchased, 1873.

49255. Distal portion of the shaft of a humerus; from Zebbug cave. *Spratt Collection. Presented*, 1874–78.

49286. The shaft of the immature right humerus; from Zebbug (*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 279, pl. lii. fig. 50. *Spratt Collection. Presented*, 1874–78.

49299–301. Three specimens of the shaft of the immature left humerus; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

44539. The shafts of an immature ulna and radius; from Benghisa (*Fig.*) gap. Described and figured by Leith-Adams, *op. cit.* p. 53, pl. xxi. figs. 10, 10 *a*, 10 *b*; these specimens belong to the same individual as No. 44537.
Leith-Adams Collection. Purchased, 1873.

44554. The shaft of an immature ulna; from Mnaidra gap. De- (*Fig.*) scribed and figured by Leith-Adams, *op. cit.* p. 57, pl. xxi. figs. 16, 16 *a*. *Leith-Adams Collection. Purchased*, 1873.

44555–6. Two imperfect specimens of the immature radius; from (*Fig.*) Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 56, pl. xxi. fig. 15.
Leith-Adams Collection. Purchased, 1873.

49275–6. Two specimens of the shaft of the fœtal radius; from Zebbug cave. *Spratt Collection. Presented*, 1874–78.

49320. The distal epiphysis of a radius; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

44528 d. A sesamoid; described and figured by Leith-Adams, *op. cit.* (*Fig.*) p. 107, pl. xx. fig. 21.
Leith-Adams Collection. Purchased, 1873.

44528 e. A sesamoid or third phalangeal. Described and figured (*Fig.*) by Leith-Adams, *op. cit.* p. 107, pl. xx. fig. 22.
Leith-Adams Collection. Purchased, 1873.

44527. An immature first phalangeal.
Leith-Adams Collection. Purchased, 1873.

49215. Fragment of shaft of femur; from Zebbug cave. Noticed by Busk, *op. cit.* p. 235.
Spratt Collection. Presented, 1874–78.

44561. The shaft of an immature left tibia.
Leith-Adams Collection. Purchased, 1873.

44540. The shaft of an immature tibia; from Benghisa gap. (*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 63, pl. xxi. fig. 13.

Leith-Adams Collection. Purchased, 1873.

44557. The shaft of an immature tibia; from Benghisa gap. (*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 63, pl. xxi. figs. 14, 14 *a*.

Leith-Adams Collection. Purchased, 1873.

44562–3–4. The proximal extremities of three immature specime of the tibia. Two are noticed by Leith-Adams, *op. cit.* p. 63. *Leith-Adams Collection. Purchased*, 1873.

49271–4 and **49303–8.** Six specimens of the shaft of the immature tibia, several of them being apparently fœtal; from Zebbug cave. *Spratt Collection. Presented*, 1874–78.

44535–41. The neural arch and the neural spines of immature (*Fig.*) vertebræ; from Benghisa gap. The former is figured by Leith-Adams, *op. cit.* pl. xxi. fig. 11.

Leith-Adams Collection. Purchased, 1873.

44367. Portion of a rib.

Leith-Adams Collection. Purchased, 1873.

44536–42. Portions of immature ribs; from Benghisa gap. One (*Fig.*) is figured by Leith-Adams, *op. cit.* pl. xxi. fig. 12.

Leith-Adams Collection. Purchased, 1873.

Elephas melitensis, Falconer[1].

Including *E. falconeri*, Busk[2].
Syn. *Loxodon melitensis*, auct.

The relationship of the present species to *E. mnaidriensis* has been mentioned under the latter head. The ridge-formula according to Leith-Adams[3] is (exclusive of talons) Mm. $\frac{3 \cdot 5 \cdot (8-9)}{3 \cdot 5 \cdot (8-9)}$, M. $\frac{(8-9) \cdot 10 \cdot 12}{(8-9) \cdot 10 \cdot 12}$. The typical form of the species is estimated to have occasionally attained a height of five feet, while the smaller form (to which Busk assigned the name *E. falconeri*) was only about three feet in height[4]. Apart from their smaller size, and the tendency to a slightly lower number of ridges, the molars are very similar to those of *E. mnaidriensis*, but the plication of the enamel is frequently

[1] 'Parthenon,' Oct. 18, 1862, p. 780.
[2] Trans. Zool. Soc. vol. vi. p. 251 (1867—read 1865).
[3] *Ibid.* vol. ix. p. 112 (1874).
[4] *Ibid.* p. 116.

rather more marked, and there are some other slight structural differences[1]. If this and the preceding form are reckoned merely as varieties of a single species, the name *E. melitensis* has the priority. As in the case of the last species, there is considerable uncertainty as to the serial position of many of the teeth, the provisional determinations of Busk and Leith-Adams (Trans. Zool. Soc. vols. vi. & ix.) being followed. The same authorities are responsible for the specific reference of the bones respectively referred to this and the preceding species.

Hab. Malta, and (?) North Africa. All the following specimens (which comprise several of the types of *E. melitensis* and all those of *E. falconeri*) were obtained from the Pleistocene cavern and rock-fissure deposits of Malta.

44332. (*Fig.*) A stylo-hyal; from Benghisa gap. Described and figured by Leith-Adams in the 'Trans. Zool. Soc.' vol. ix. p. 45, pl. xv. fig. 10.

Leith-Adams Collection. Purchased, 1873.

44529. A small left exoccipital; from Benghisa gap. Noticed by Leith-Adams, *op. cit.* p. 37.

Leith-Adams Collection. Purchased, 1873.

44368. A petrosal. Noticed by Leith-Adams, *op. cit.* p. 36.

Leith-Adams Collection. Purchased, 1873.

44235. (*Fig.*) Fragment of the facial part of an immature cranium, showing the incisors and part of the left mm. 4; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 18, pl. i. fig. 18.

Leith-Adams Collection. Purchased, 1873.

44218. (*Fig.*) The palatal region of the cranium, showing the third true molar of either side, about one-third worn; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 29, pl. iv. fig. 1.

Leith-Adams Collection. Purchased, 1873.

44219. Part of the palate, showing m. 3 of either side, the left being imperfect; from Mnaidra gap. Noticed by Leith-Adams, *op. cit.* p. 30 (as No. 87).

Leith-Adams Collection. Purchased, 1873.

44249. (*Fig.*) Fragment of the right maxilla with mm 3.; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 14, pl. ii. fig. 1.

Leith-Adams Collection. Purchased, 1873.

[1] Trans. Zool. Soc. vol. ix. p. 110 (1874).

49240. The germ of a third (?) upper milk-molar; from Zebbug (*Fig.*) cave. Described and figured by Busk in the 'Trans. Zool. Soc.' vol. vi. p. 289, pl. liii. figs. 6, 6 *a*; and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 297, pl. xi. figs. 4, 4 *a*. *Spratt Collection. Presented*, 1874–78.

44225. A third upper milk-molar; from Mnaidra gap. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* p. 14, pl. i. figs. 7, 7 *a*. *Leith-Adams Collection. Purchased*, 1873.

44237. A fourth upper milk-molar. Noticed by Leith-Adams, *op. cit.* p. 17. *Leith-Adams Collection. Purchased*, 1873.

49206 b. Fragment of a fourth upper milk-molar (?); from Zebbug (*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 290, pl. liii. figs. 8, 8 *a*; it agrees very closely in size with No. 49268. *Spratt Collection. Presented*, 1874–78.

44228. A fourth upper milk-molar; from Benghisa gap. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* p. 17, pl. i. fig. 11. *Leith-Adams Collection. Purchased*, 1873.

44231. A fourth upper milk-molar; from Mnaidra gap. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* p. 18, pl. i. fig. 17. *Leith-Adams Collection. Purchased*, 1873.

44245. A fourth upper milk-molar; from Mnaidra gap. Noticed by Leith-Adams, *op. cit.* p. 18. *Leith-Adams Collection. Purchased*, 1873.

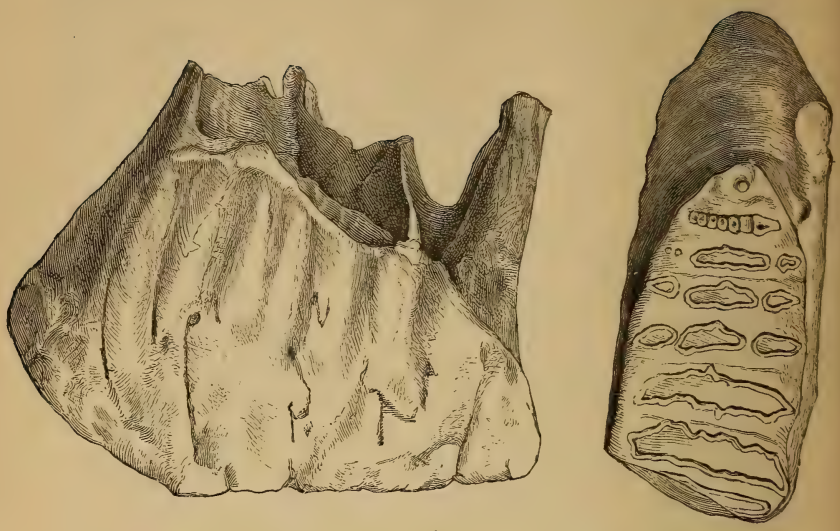
44239. A fourth upper milk-molar; from Mnaidra gap. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* p. 18, pl. i. fig. 10. *Leith-Adams Collection. Purchased*, 1873.

49268. The fourth right upper milk-molar (?); from Zebbug cave. (*Fig.*) This specimen (woodcut, fig. 27) is described and figured by Busk, *op. cit.* p. 290, fig. 44; it apparently indicates a tooth one place earlier in the series than No. 49267. *Spratt Collection. Presented*, 1873.

49241. Part of the germ of a fourth upper milk-molar; from Zebbug (*Fig.*) cave. Figured by Busk, *op. cit.* pl. liii. figs. 7, 7 *a*. *Spratt Collection. Presented*, 1874–78.

49267. The first (?) right upper true molar; from Zebbug cave. (*Fig.*) Described and figured by Busk, *op. cit.* p. 295, pl. liii. figs. 9, 9 *a* (as *E. falconeri*), and in 'Falconer's Palæontological Memoirs,' vol. ii. p. 294, pl. xi. figs. 2, 2 *a*; it is also noticed by Leith-Adams, *op. cit.* p. 20. Falconer

Fig. 27.



Elphas melitensis.—The fourth right upper milk-molar (?); from Zebbug cave, Malta. ½. The left border of the upright figure is the inner border of the specimen. (From the Trans. Zool. Soc.)

was doubtful whether to regard this tooth as m. 1 or m. 2; Busk provisionally adopted the former view, which is accepted by Leith-Adams.

Spratt Collection. Presented, 1874–78.

44252. (*Fig.*) The hinder portion of a first upper true molar; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 20, pl. ii. figs. 9, 9 *a*.

Leith-Adams Collection. Purchased, 1873.

44312. (*Fig.*) The third left upper true molar; from Zebbug cave. Described and figured in 'Falconer's Palæontological Memoirs,' vol. ii. p. 292, pl. xi. figs. 1, 1 *a*; and noticed by Busk, *op. cit.* p. 296, and by Leith-Adams, *op. cit.* x. p. 28.

Leith-Adams Collection. Purchased, 1873.

49235. (*Fig.*) A milk-incisor; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 284, pl. liii. figs. 1, 1 *a*, 1 *b*; and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 296, pl. xi. figs. 3, 3 *a*, 3 *b*.

Spratt Collection. Presented, 1874–78.

44220. A milk-incisor; from Mnaidra gap. Described and figured (*Fig.*) by Leith-Adams, *op. cit.* p. 8, pl. i. fig. 2.
Leith-Adams Collection. Purchased, 1873.

44322. Middle portion of an incisor. Described and figured by (*Fig.*) Leith-Adams, *op. cit.* p. 9, pl. xi. fig. 13.
Leith-Adams Collection. Purchased, 1873.

44328–9. Two fragments of small incisors. Described and figured (*Fig.*) by Leith-Adams, *op. cit.* p. 9, pl. xi. figs. 19, 20.
Leith-Adams Collection. Purchased, 1873.

44330. Fragments of an incisor.
Leith-Adams Collection. Purchased, 1873.

49265. The extremity of a small incisor; from Zebbug cave. Noticed by Busk, *op. cit.* p. 285 (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

49266. A small incisor; from Zebbug cave. Described and figured (*Fig.*) by Busk, *op. cit.* p. 285, pl. lii. fig. 48 (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

44250. Fragment of the mandible containing $\overline{\text{mm. 3}}$; from Mnaidra (*Fig.*) gap. Described and figured by Leith-Adams, *op. cit.* p. 14, pl. ii. fig. 2. *Leith-Adams Collection. Purchased*, 1873.

44260. Fragment of the right ramus of the mandible with $\overline{\text{m. 1}}$; (*Fig.*) from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 20, pl. vi. figs. 5, 5 *a*.
Leith-Adams Collection. Purchased, 1873.

44264. The greater portion of the mandible, showing $\overline{\text{m. 2}}$ of either (*Fig.*) side, about one-third worn; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 25, pl. v. figs. 1, 1 *a*, 1 *b*.
Leith-Adams Collection. Purchased, 1873.

44259. Part of the left ramus of the mandible showing, the alveoli (*Fig.*) of two teeth; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 39, pl. vi. fig. 4.
Leith-Adams Collection. Purchased, 1873.

44293. The symphysis and part of the left ramus of the mandible, (*Fig.*) showing a portion of $\overline{\text{m. 2}}$ or $\overline{\text{m. 3}}$; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 40, pl. vi. fig. 3. *Leith-Adams Collection. Purchased*, 1873.

44294. Part of the symphysis and right ramus of the mandible, (*Fig.*) containing $\overline{\text{m. 3}}$ in a comparatively early stage of wear; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 30, pl. vi. figs. 1, 1 *a*.

Leith-Adams Collection. Purchased, 1873.

44290. Part of the left ramus of the mandible, containing $\overline{\text{m. 3}}$, (*Fig.*) together with the corresponding tooth of the opposite side; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 31, pl. ix. figs. 1, 1 *a*, 2: the specimen belongs to the small form.

Leith-Adams Collection. Purchased, 1873.

49288. The anterior portion of the right ramus of the mandible; from Zebbug cave. Noticed by Busk, *op. cit.* p. 276.

Spratt Collection. Presented, 1874–78.

49216. The ascending portion of a mandibular ramus; from Zebbug (*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 236, pl. xlvii. fig. 13.

Spratt Collection. Presented, 1874–78.

49217. Fragment of a mandible; from Zebbug cave. Noticed by Busk, *op. cit.* p. 236.

Spratt Collection. Presented, 1874–78.

49236. A second lower milk-molar; from Zebbug cave. Described (*Fig.*) and figured by Busk, *op. cit.* p. 286, pl. liii. figs. 2, 2 *a*; and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 297, pl. xii. figs. 1, 1 *a*.

Spratt Collection. Presented, 1874–78.

44226. A third lower milk-molar; from Benghisa gap. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* p. 14, pl. i. figs. 8, 8 *a*.

Leith-Adams Collection. Purchased, 1873.

44246. A third lower milk-molar.

Leith-Adams Collection. Purchased, 1873.

49237. Part of the third left lower milk-molar; from Zebbug cave. (*Fig.*) Described and figured by Busk. *op. cit.* p. 287, pl. liii. figs. 3, 3 *a*. *Spratt Collection. Presented*, 1874–78.

49238. The third left lower milk-molar; from Zebbug cave. De- (*Fig.*) scribed and figured by Busk, *op. cit.* p. 288, pl. liii. figs. 4, 4 *a*; and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 297, pl. xii. figs. 2, 2 *a*.

Spratt Collection. Presented, 1874–78.

44271. A fourth lower milk-molar; from Benghisa gap. De-
(*Fig.*) scribed and figured by Leith-Adams, *op. cit.* p. 20, pl. iv. fig. 3. This tooth is much larger than No. 49239, but is apparently of the same width as the one ridge of $\overline{\text{mm. 4}}$ shown in No. 44250.

Leith-Adams Collection. *Purchased*, 1873.

49239. The fourth left lower milk-molar; from Zebbug cave.
(*Fig.*) Described and figured by Busk, *op. cit.* p. 288, pl. liii. figs. 5, 5 *a*; and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 297, pl. xii. figs. 3, 3 *a*.

Spratt Collection. *Presented*, 1874–78.

44265. The first right lower true molar; from Mnaidra gap.
(*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 20, pl. v. fig. 2; it apparently belongs to the small form.

Leith-Adams Collection. *Purchased*, 1873.

44261. An imperfect first lower true molar.

Leith-Adams Collection. *Purchased*, 1873.

44263. An imperfect first (?) lower true molar.

Leith-Adams Collection. *Purchased*, 1873.

44262. An imperfect lower true molar.

Leith-Adams Collection. *Purchased*, 1873.

44317. Fragment of a well-worn second (?) lower true molar.

Leith-Adams Collection. *Purchased*, 1873.

44251. An imperfect second lower true molar; from Mnaidra gap.
(*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 25, pl. ii. figs. 8, 8 *a*.

Leith-Adams Collection. *Purchased*, 1873.

44253. Anterior portion of a small third lower true molar; from
(*Fig.*) Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 32, pl. ii. figs. 10, 10 *a*.

Leith-Adams Collection. *Purchased*, 1873.

49206 a. The hinder half of the third right lower true molar; from
(*Fig.*) Zebbug cave. Described and figured by Busk, *op. cit.* p. 293, pl. liii. fig. 13.

Spratt Collection. *Presented*, 1874–78.

49243. The third right lower true molar, imperfect anteriorly;
(*Fig.*) from Zebbug cave. Described and figured by Busk, *op. cit.* p. 291, pl. liii. fig. 12.

Spratt Collection. *Presented*, 1874–78.

49242. The third left lower true molar, about one-third worn ; from
(*Fig.*) Zebbug cave. Described and figured in 'Falconer's Palæontological Memoirs,' vol. ii. p. 298, pl. xii. figs. 4, 4 *a*, and by Busk, *op. cit.* p. 294, pl. liii. figs. 11, 11 *a*. Busk seems to have had some doubt as to the serial position of this tooth, but Leith-Adams ('The Nile Valley and Malta,' p. 227, note 6) confirms Falconer's view ; it is inferred that when complete the specimen had 12 or 13 ridges. *Spratt Collection. Presented*, 1874–78.

44534. A rolled molar adhering to a pebble ; from Malak cave.
Leith-Adams Collection. Purchased, 1873.

49225. The glenoidal portion of a scapula ; from Zebbug cave.
(*Fig.*) Described and figured by Busk, *op. cit.* p. 243, pl. xlviii. figs. 23, 23 *a*. *Spratt Collection. Presented*, 1874–78.

44373. Fragment of a scapula.
Leith-Adams Collection. Purchased, 1873.

44371. The glenoidal half of a scapula ; from Benghisa gap. De-
(*Fig.*) scribed and figured by Leith-Adams, *op. cit.* p. 50, pl. xii. figs. 2, 2 *a*. *Leith-Adams Collection. Purchased*, 1873.

44372. The glenoidal extremity of a scapula ; from Benghisa gap.
(*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 50, pl. xii. figs. 3, 3 *a*.
Leith-Adams Collection. Purchased, 1873.

49252. The glenoidal half of a small right scapula ; from Zebbug
(*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 254, pl. xlvii. fig. 14 *bis* (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

49253. A small left humerus, wanting the proximal epiphysis ;
(*Fig.*) from Zebbug cave. Described and figured by Busk, *op. cit.* p. 255, pl. xlix. figs. 26, 26 *a bis* (as *E. falconeri*) ; and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 303, pl. xiv. figs. 1–5.
Spratt Collection. Presented, 1874–78.

49232. Fragment of the head of a humerus ; from Zebbug cave. Noticed by Busk, *op. cit.* p. 235.
Spratt Collection. Presented, 1874–78.

44378. The head of a humerus ; from Gandia fissure. Described
(*Fig.*) and figured by Leith-Adams, *op. cit.* p. 52, pl. xi. fig. 4.
Leith-Adams Collection. Purchased, 1873.

44376. Part of the proximal end of a humerus.
Leith-Adams Collection. Purchased, 1873.

44375. The proximal half of the right humerus; from Benghisa
(*Fig.*) gap. Described and figured by Leith-Adams, *op. cit.* p. 50, pl. xii. fig. 1.
Leith-Adams Collection. Purchased, 1873.

44429. Part of the shaft of a humerus.
Leith-Adams Collection. Purchased, 1873.

49285. The shaft of a young humerus; from Zebbug cave. De-
(*Fig.*) scribed and figured by Busk, *op. cit.* p. 279, pl. lii. fig. 49 (as *E. falconeri*). *Spratt Collection. Presented*, 1874–78.

49287. Distal portion of the shaft of a small right humerus; from Zebbug cave. Noticed by Busk, *op. cit.* p. 280 (as *E. falconeri*). *Spratt Collection. Presented*, 1874–78.

49254. The distal extremity of a small humerus; from Zebbug
(*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 259, pl. xlix. fig. 27 (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

49226. The proximal extremity of the right humerus; from Zebbug
(*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 244, pl. xlviii. fig. 22. *Spratt Collection. Presented*, 1874–78.

49228. The olecranal process of an ulna; from Zebbug cave. De-
(*Fig.*) scribed and figured by Busk, *op. cit.* p. 246, pl. xlviii. fig. 25. *Spratt Collection. Presented*, 1874–78.

44382. The distal epiphysis of an ulna; from Benghisa gap. De-
(*Fig.*) scribed and figured by Leith-Adams, *op. cit.* p. 55, pl. xiii. fig. 3. *Leith-Adams Collection. Purchased*, 1873.

44552. Proximal portion of an ulna, perhaps immature; from Gandia
(*Fig.*) fissure. Described and figured by Leith-Adams, *op. cit.* p. 57, pl. xxi. fig. 17.
Leith-Adams Collection. Purchased, 1873.

44389. Proximal portion of the shaft of an ulna; from Benghisa
(*Fig.*) gap. Described and figured by Leith-Adams, *op. cit.* p. 55, pl. x. figs. 9, 9 *a*.
Leith-Adams Collection. Purchased, 1873.

49256. The proximal half of a small right ulna; from Zebbug
(*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 260, pl. xlix. figs. 28, 28 *a* (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

49257. The proximal half of a small left ulna; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

49227–9. Two imperfect shafts of the ulna; from Zebbug cave.
(*Fig.*) The former is described and figured by Busk, *op. cit.* p. 245, pl. xlviii. figs. 24, 24 *a*.
Spratt Collection. Presented, 1874–78.

44556. Distal portion of the shaft of an immature radius provisionally referred to this species.
Leith-Adams Collection. Purchased, 1873.

44388. The distal epiphysis of a radius; from Benghisa gap. De-
(*Fig.*) scribed and figured by Leith-Adams, *op. cit.* p. 55, pl. xiii. fig. 2. *Leith-Adams Collection. Purchased*, 1873.

44402. The right scaphoid; from Benghisa gap. Described and
(*Fig.*) figured by Leith-Adams, *op. cit.* p. 67, woodcut fig. 4.
Leith-Adams Collection. Purchased, 1873.

44403. The right lunar; from Benghisa gap. Described and figured
(*Fig.*) by Leith-Adams, *op. cit.* p. 68, pl. xviii. fig. 4.
Leith-Adams Collection. Purchased, 1873.

44466. The right cuneiform; from Benghisa gap. Described and
(*Fig.*) figured by Leith-Adams, *op. cit.* p. 70, pl. xviii. fig. 9.
Leith-Adams Collection. Purchased, 1873.

44467. An imperfect cuneiform.
Leith-Adams Collection. Purchased, 1873.

44468. The right cuneiform; from Benghisa gap. Described and
(*Fig.*) figured by Leith-Adams, *op. cit.* p. 70, pl. xviii. fig. 8.
Leith-Adams Collection. Purchased, 1873.

44533. The left cuneiform, of very small size; from Benghisa gap.
(*Fig.*) Described and figured by Leith-Adams, *op. cit.* p. 70, pl. xviii. fig. 7.
Leith-Adams Collection. Purchased, 1873.

44404. The right trapezoid; from Mnaidra gap. Described and
(*Fig.*) figured by Leith-Adams, *op. cit.* p. 72, pl. xvii. fig. 11.
Leith-Adams Collection. Purchased, 1873.

49352. A small magnum; from Zebbug cave.
Spratt Collection. Presented, 1874–78.

44405. The left magnum; from Mnaidra gap. Described and
(*Fig.*) figured by Leith-Adams, *op. cit.* p. 73, pl. xvii. fig. 14.
Leith-Adams Collection. Purchased, 1873.

44406. The left magnum (imperfect).
Leith-Adams Collection. Purchased, 1873.

44407. The left unciform; from Gandia fissure. Described and (*Fig.*) figured by Leith-Adams, *op. cit.* p. 74, pl. xvii. fig. 9.
Leith-Adams Collection. Purchased, 1873.

44387. A small left unciform. Described by Leith-Adams, *op. cit.* p. 74. *Leith-Adams Collection. Purchased*, 1873.

44545. An imperfect unciform. Described by Leith-Adams, *op. cit.* p. 73. *Leith-Adams Collection. Purchased*, 1873.

44408–9. The right and left pisiform; from Mnaidra gap. Both (*Fig.*) are described by Leith-Adams, *op. cit.* p. 72, the latter being figured by him in pl. xviii. fig. 6.
Leith-Adams Collection. Purchased, 1873.

44489. A first metacarpal; from Mnaidra gap. Described and (*Fig.*) figured by Leith-Adams, *op. cit.* p. 91, pl. v. fig. 4.
Leith-Adams Collection. Purchased, 1873.

44487. A first metacarpal and first phalangeal; from Mnaidra (*Fig.*) gap. Described and figured by Leith-Adams, *op. cit.* p. 91, pl. v. fig. 5.
Leith-Adams Collection. Purchased, 1873.

44484. A third (?) metacarpal; from Mnaidra gap. Described and (*Fig.*) figured by Leith-Adams, *op. cit.* p. 95, pl. v. fig. 3.
Leith-Adams Collection. Purchased, 1873.

44422–3. The associated right third and fourth metacarpals; from (*Fig.*) Benghisa gap. Described and figured by Leith-Adams, *op. cit.* pp. 95, 99, pl. xix. figs. 3, 4.
Leith-Adams Collection. Purchased, 1873.

44424. The left fifth metacarpal. Described by Leith-Adams, *op. cit.* p. 103. *Leith-Adams Collection. Purchased*, 1873.

44425. The left fifth metacarpal; from Mnaidra gap. Described (*Fig.*) and figured by Leith-Adams, *op. cit.* p. 103, pl. xix. fig. 12. *Leith-Adams Collection. Purchased*, 1873.

44496 a. The first phalangeal of the second (?) digit of a manus; (*Fig.*) from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 105, pl. xx. fig. 14.
Leith-Adams Collection. Purchased, 1873.

44496. The first phalangeal of the third digit of a manus; from (*Fig.*) Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 96, pl. xx. fig. 16.
Leith-Adams Collection. Purchased, 1873.

44496*. The first phalangeal of the fifth digit of the left manus; (*Fig.*) from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 106, pl. xx. fig. 11.
Leith-Adams Collection. Purchased, 1873.

49258. A small first phalangeal of the third digit of a manus; from (*Fig.*) Zebbug cave. Described and figured by Busk, *op. cit.* p. 263, pl. li. fig. 41 (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

44543–50. Seven associated bones of the left manus of a small in- (*Fig.*). dividual; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 75, pl. xxi. figs. 1–7.
Leith-Adams Collection. Purchased, 1873.

49224. Part of an ischium; from Zebbug cave. Described and (*Fig.*) figured by Busk, *op. cit.* p. 242, pl. xlviii. fig. 26.
Spratt Collection. Presented, 1874–78.

44430. The left innominate; from Benghisa gap. Described and (*Fig.*) figured by Leith-Adams, *op. cit.* p. 49, pl. xv. figs. 9, 9*a*.
Leith-Adams Collection. Purchased, 1873.

49259. The greater part of a small left innominate; from Zebbug (*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 263, pl. l. fig. 31 (as *E. falconeri*); and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 303, pl. xiii. figs. 5, 6.
Spratt Collection. Presented, 1874–78.

49260. The shaft of a small left femur; from Zebbug cave. De- (*Fig.*) scribed and figured by Busk, *op. cit.* p. 266, pl. l. figs. 29, 29 *a* (as *E. falconeri*); and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 303, pl. xiv. figs. 6–10.
Spratt Collection. Presented, 1874–78.

44431. A femur, wanting the proximal extremity; from Benghisa (*Fig.*) gap. Described and figured by Leith-Adams, *op. cit.* p. 59, pl. xiv. figs. 3, 3 *a*.
Leith-Adams Collection. Purchased, 1873.

49230. The shaft of the right femur; from Zebbug cave. Described (*Fig.*) and figured by Busk, *op. cit.* p. 247, pl. xlv. fig. 6.
Spratt Collection. Presented, 1874–78.

49231. Part of the head of a femur; from Zebbug cave. Noticed by Busk, *op. cit.* p. 236.
Spratt Collection. Presented, 1874–78.

49261. (*Fig.*) The proximal portion of a small left femur; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 264, pl. l. fig. 30 (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

44553. (*Fig.*) The proximal portion of the shaft of a femur; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 60, pl. xxi. fig. 18.
Leith-Adams Collection. Purchased, 1873.

44446. (*Fig.*) The right patella, associated with No. 44431; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 65, pl. xv. fig. 6.
Leith-Adams Collection. Purchased, 1873.

49269–70. (*Fig.*) The proximal half of the shaft and the epiphysis of an immature tibia; from Zebbug cave. Figured by Busk, *op. cit.* pl. xlvii. figs. 15, 15 *a*.
Spratt Collection. Presented, 1874–78.

49304–5. (*Fig.*) Two small specimens of the shaft of the tibia; from Zebbug cave. *Spratt Collection. Presented*, 1874–78.

44442–3. (*Fig.*) The distal extremities of the right and left fibula; from Mnaidra gap. Both are described by Leith-Adams, *op. cit.* p. 64, the former being figured in pl. xv. fig. 5.
Leith-Adams Collection. Purchased, 1873.

49289. (*Fig.*) The distal extremity of a small fibula (?); from Zebbug cave. Figured by Busk, *op. cit.* pl. lii. figs. 47, 47 *a* (as *E. falconeri*). *Spratt Collection. Presented*, 1874–78.

44451–6. (*Fig.*) The right and left calcaneum; from Benghisa gap. Both are described by Leith-Adams, *op. cit.* p. 82, the former being figured in pl. xvi. fig. 5.
Leith-Adams Collection. Purchased, 1873.

44452. (*Fig.*) The left astragalus; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 80, pl. x. fig. 10; and by Busk, *op. cit.* p. 270, woodcut fig. 29.
Leith-Adams Collection. Purchased, 1873.

44531. (*Fig.*) A very small right astragalus (woodcut, fig. 28); from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 81, pl. xvi. fig. 3; and by Busk, *op. cit.* p. 270, woodcut fig. 30 (as *E. falconeri*).

Leith-Adams Collection. Purchased, 1873.

Fig. 28.

Elephas melitensis.—The right astragalus of a small race; from the Pleistocene of Malta. ½. (From the Trans. Zool. Soc.)

49263. (*Fig.*) An equal-sized left astragalus; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 268, pl. xlvii. fig. 14 (as *E. falconeri*).

Spratt Collection. Presented, 1874–78.

44532. (*Fig.*) The (immature?) right navicular; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 83, pl. xvii. fig. 8.

Leith-Adams Collection. Purchased, 1873.

44469. The right cuboid. Noticed by Leith-Adams, *op. cit.* p. 85.

Leith-Adams Collection. Purchased, 1873.

44470. (*Fig.*) The left cuboid; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 85, pl. xvii. fig. 5.

Leith-Adams Collection. Purchased, 1873.

44410. (*Fig.*) The left entocuneiform; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 88, pl. xvii. fig. 6.

Leith-Adams Collection. Purchased, 1873.

44472. The left second metatarsal.
Leith-Adams Collection. Purchased, 1873.

44473. (*Fig.*) The left second metatarsal; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 93, pl. xx. figs. 5, 5 *a*. *Leith-Adams Collection. Purchased*, 1873.

44485. (*Fig.*) The left second metatarsal; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 94, pl. xx. figs. 3, 3 *a*. *Leith-Adams Collection. Purchased*, 1873.

44483, 44488. (*Fig.*) The associated left third and fourth metatarsals of a small individual; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* pp. 96, 100, pl. xix. figs. 6, 7. *Leith-Adams Collection. Purchased*, 1873.

49264. (*Fig.*) A small fourth metatarsal; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 271, pl. li. fig. 40 (as *E. falconeri*). *Spratt Collection. Presented*, 1874–78.

44478. (*Fig.*) The right fourth metatarsal; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 100, pl. xx. fig. 6. *Leith-Adams Collection. Purchased*, 1873.

44486. The left first metatarsal. Noticed by Leith-Adams, *op. cit.* p. 91. *Leith-Adams Collection. Purchased*, 1873.

44495. (*Fig.*) The left first metatarsal; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 91, pl. xx. fig. 2. *Leith-Adams Collection. Purchased*, 1873.

44527*. (*Fig.*) The right first metatarsal or metacarpal; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 91, pl. xix. fig. 9. *Leith-Adams Collection. Purchased*, 1873.

44490. (*Fig.*) The second phalangeal of the first digit of the left pes; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 91, pl. xix. fig. 8.
Leith-Adams Collection. Purchased, 1873.

44520. (*Fig.*) The first phalangeal of the second digit of a pes; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 104, pl. xx. fig. 7.
Leith-Adams Collection. Purchased, 1873.

44523. (*Fig.*) The first phalangeal of the fifth digit of the right pes; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 106, pl. xix. fig. 15. The specific reference of this and the preceding specimen is provisional.
Leith-Adams Collection. Purchased, 1873.

49218. (*Fig.*) One half of the atlas vertebra; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 238, pl. xlvii. fig. 12. *Spratt Collection. Presented*, 1874–78.

49244. (*Fig.*) The left half of a small atlas vertebra; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 251, pl. li. figs. 32, 32 *a* (as *E. falconeri*). *Spratt Collection. Presented*, 1874–78.

44333. (*Fig.*) The imperfect atlas vertebra; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 46, pl. xiii. figs. 1, 1 *a*, 1 *b*. *Leith-Adams Collection. Purchased*, 1873.

49233. (*Fig.*) Part of the atlas vertebra; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 251, pl. li. figs. 33, 33 *a*. *Spratt Collection. Presented*, 1874–78.

49234. (*Fig.*) Fragment of the atlas vertebra; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 238, pl. li. fig. 35. *Spratt Collection. Presented*, 1874–78.

49219. (*Fig.*) The seventh cervical vertebra; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 238, pl. xlvi. fig. 9. *Spratt Collection. Presented*, 1874–78.

44337–42. (*Fig.*) The first seven associated dorsal vertebræ, mostly wanting the neural arches; from Mnaidra gap. Described and figured by Leith-Adams, *op. cit.* p. 46, pl. xi. fig. 9. The first two vertebræ are also figured in pl. ix. fig. 3. *Leith-Adams Collection. Purchased*, 1873.

44347, 44348, 44351. Three imperfect trunk-vertebræ. *Leith-Adams Collection. Purchased*, 1873.

49220. (*Fig.*) The sixth or seventh dorsal vertebra; from Zebbug cave. Described and figured by Busk, *op. cit.* p. 240, pl. xlvi. figs. 10, 10 *a*; and also in 'Falconer's Palæontological Memoirs,' vol. ii. p. 302, pl. xiii. figs. 1–4. *Spratt Collection. Presented*, 1874–78.

44359. (*Fig.*) The centrum of a small middle dorsal vertebra; from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 47, pl. x. fig. 5. *Leith-Adams Collection. Purchased*, 1873.

44354–6. The centra of three dorsal vertebræ. *Leith-Adams Collection. Purchased*, 1873.

44530. Extremity of the neural spine of a trunk-vertebra. *Leith-Adams Collection. Purchased*, 1873.

49245. The neural arch of a small dorsal vertebra; from Zebbug
(*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 253, pl. li. figs. 34, 34 *a* (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

49246. The neural spine of a small dorsal vertebra; from Zebbug
(*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 253, pl. li. figs. 36, 36 *a* (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

49247–50. Four fragments of small neural arches and spines; from Zebbug cave. Noticed by Busk, *op. cit.* p. 253 (as *E. falconeri*). *Spratt Collection. Presented*, 1874–78.

49222. Neural spine of a dorsal vertebra; from Zebbug cave.
(*Fig.*) Described and figured by Busk, *op. cit.* p. 241, pl. xlv. fig. 7. *Spratt Collection. Presented*, 1874–78.

49221. The imperfect second or third lumbar vertebra; from Zeb-
(*Fig.*) bug cave. Described and figured by Busk, *op. cit.* p. 241. pl. xlvi. figs. 11, 11 *a*.
Spratt Collection. Presented, 1874–78.

44357–8. Two imperfect caudal vertebræ.
Leith-Adams Collection. Purchased, 1873.

44369–70. Heads of the second and third ribs of small individuals;
(*Fig.*) from Benghisa gap. Described and figured by Leith-Adams, *op. cit.* p. 47, pl. ix. figs. 6, 6 *a*, 7.
Leith-Adams Collection. Purchased, 1873.

49223. The proximal half of the second right rib; from Zebbug
(*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 241, pl. xlv. fig. 8. *Spratt Collection. Presented*, 1874–78.

49251. The proximal portion of a small second rib; from Zebbug
(*Fig.*) cave. Described and figured by Busk, *op. cit.* p. 253, pl. li. fig. 31 (as *E. falconeri*).
Spratt Collection. Presented, 1874–78.

Elephas namadicus, Falconer and Cautley[1].

Syn. *Euelephas namadicus*, auct.

The cheek-teeth of this species appear frequently almost or quite indistinguishable from those of the broad-toothed variety of *E. antiquus*, although the ridge-formula is, on the whole, rather higher and the ridges themselves are somewhat taller: some teeth, however

[1] Fauna Antiqua Sivalensis, pt. 2, pl. xiii. (1846).

especially those from Burma, China, and Japan, show excessive plication of the enamel, and thereby approximate to *E. indicus*, although with a lower ridge-formula[1]. In their height and number of ridges, the teeth are intermediate between those of *E. hysudricus* and *E. indicus*; and were it not for the peculiar character of the cranium, the species might be regarded as the direct link between the two. The adult cranium is characterized by the presence of a bold, overlapping, transverse ridge on the frontals[2], which appears to be wanting in *E. antiquus*. On the occipital aspect the great depth of the fissure for the ligamentum nuchæ indicates that the species is probably a descendant of *E. hysudricus*.

Hab. India, Burma[3], China[4], and Japan[5]. In India the species occurs in the Pleistocene of the Narbada valley, and it is probable that the other specimens are from strata of equivalent age. The woodcut (fig. 29) represents a molar from the Pleistocene of Japan,

Fig. 29.

Elephas namadicus.—The second right upper true molar; from the Pleistocene between Kanagawa and Tokio (Yedo), Japan. ⅔. The lower border of the figure is the inner border of the specimen. (From the Quart. Journ. Geol. Soc.)

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[1] One of the Japanese specimens was referred by Leith-Adams to *E. indicus*.

[2] It has been suggested by Leith-Adams ('British Fossil Elephants' [Mon. Pal. Soc.], p. 52) that this feature is partly due to crushing—a view disproved by its occurrence in numerous specimens in the Indian Museum, Calcutta (see 'Palæontologia Indica,' ser. 10, vol. i. p. 281, and the writer's 'Catalogue of Pleistocene and Prehistoric Vertebrata in the Indian Museum,' p. 14 (1886).

[3] Specimens from the Irawadi Valley in the Indian Museum.

[4] *Vide* p. 169, No. 29007.

[5] Naumann, 'Palæontographica,' vol. xxviii. art. 1, p. 25 (1881).

which may pretty safely be referred to the present species, although it was described by Leith-Adams, in the 'Quart. Journ. Geol. Soc.' vol. xxiv. p. 496, as belonging to *E. indicus*[1]. This specimen is undoubtedly specifically identical with the Japanese specimens described by Naumann, one of which (pl. vii.) was obtained from the neighbourhood of Tokio; the third lower true molar in these specimens (pl. vi.) has but sixteen ridges, and therefore differs widely from m. 3 of *E indicus*.

All the following specimens are from the Narbada Valley, and, unless otherwise indicated, were presented by C. Fraser, Esq., 1849.

M. 3092. (*Fig.*) The cranium, wanting the incisive alveoli, but showing portions of the third true molar of either side. This specimen is figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pls. xii. A. and xii. B. figs. 1–3, and is the type of the species.

Purchased from the Directors of the United Service Museum.

M. 3093. (*Fig.*) The imperfect immature cranium, showing portions of the first (?) true molar. Figured by Falconer and Cautley, *op. cit.* pl. xxiv. A. figs. 4, 4 *a*. The frontal ridge is comparatively small, leaving a large flat space above the nasal aperture. There is a fragment of the right incisor of the same individual.

36687. (*Fig.*) Fragment of the palate, showing the imperfect and half-worn m. 3 of either side. Figured by Falconer and Cautley, *op. cit.* pl. xiii. figs. 2, 2 *a*.

Presented by the Secretary of State for India, 1860.

M. 3094. Fragment of the left maxilla, containing the hinder half of the well-worn m. 3.

29007. The hinder half of a third left upper true molar, provisionally referred to this species; from the Pleistocene of China. This specimen is noticed by Busk in the 'Quart. Journ. Geol. Soc.' vol. xxiv. p. 498 (1868), where it is referred to *E. armeniacus*. It agrees, however, very closely with Nos. 36687 and M. 3094, and shows the deep grooving of the enamel characteristic of this species and *E. antiquus*; the ridges are farther apart than in *E. armeniacus*, and their wear is different.

Purchased from D. Hanbury, Esq., 1854.

[1] A cast of this specimen, which the writer has compared with the specimens in the Museum, is preserved in the Museum of the Geological Society.

M. 3095. (*Fig.*) Fragment of a first or second upper (?) true molar, in a partially-worn condition. Figured by Falconer and Cautley, *op. cit.* pl. xiii. figs. 3, 3 *a*.

M. 1992. (*Fig.*) An imperfect third upper true molar, longitudinally and vertically bisected. Figured by Falconer and Cautley, *op. cit.* pl. xiii. figs. 1, 1 *a*, 1 *b*.

M. 3100. (*Fig.*) The greater portion of the mandible, showing $\overline{\text{m. 3}}$ of either side in a damaged condition. Figured by Falconer and Cautley, *op. cit.* pl. xii. c. figs. 5, 5 *a*.

M. 3100 a. (*Fig.*) The greater part of the left ramus of the mandible, containing $\overline{\text{m. 3}}$ in a half-worn condition. Figured by Falconer and Cautley, *op. cit.* pl. xii. c. figs. 4, 4 *a*[1]; the tooth has twenty ridges and talons.

M. 3099. (*Fig.*) Two fragments of opposite rami of the mandible, each containing the half-worn $\overline{\text{m. 2}}$, which has thirteen ridges. The fragment of the left side is figured by Falconer and Cautley, *op. cit.* pl. xii. D. figs. 3, 3 *a*.

M. 3101. (*Fig.*) Part of the right ramus of the mandible, containing a fragment of a worn tooth, which is probably $\overline{\text{m. 1}}$, and a complete tooth, which is probably $\overline{\text{m. 2}}$. Figured by Falconer and Cautley, *op. cit.* pl. xii. D. figs. 2, 2 *a*. The complete tooth has fourteen or fifteen ridges, and, if its serial position be rightly determined, indicates a small individual.

M. 3102. (*Fig.*) Part of the left ramus of the mandible, showing the slightly worn $\overline{\text{m. 1}}$, which has thirteen or fourteen ridges. Figured by Falconer and Cautley, *op. cit.* pl. xii. D. figs. 1, 1 *a*.

M. 3103. (*Fig.*) Part of the right ramus of the mandible, showing $\overline{\text{mm. 4}}$, which is well-worn and shows ten ridges. Figured by Falconer and Cautley, *op. cit.* pl. xii. c. figs. 3, 3 *a*.

M. 3096. (*Fig.*) Fragment of the left ramus of the mandible, containing the greater part of the well-worn $\overline{\text{mm. 4}}$, which apparently had nine or ten ridges. Figured by Falconer and Cautley, *op. cit.* pl. xii. c. figs. 2, 2 *a*.

M. 3097. (*Fig.*) An imperfect early molar, perhaps belonging to the present species. Figured by Falconer and Cautley, *op. cit.* pl. lvi. figs. 12, 12 *a* (without specific name).

M. 3098. (*Fig.*) One half of a fourth lower milk-molar. Figured by Falconer and Cautley, *op. cit.* pl. xii. c. figs. 1, 1*a* (as ?$\overline{\text{m. 1}}$).

[1] Described as of the right side.

17133. Fragment of an incisor.

M. 3014. Fragment of an incisor. Figured by Falconer and (*Fig.*) Cautley, *op. cit.* pl. xli. fig. 5.

36700. The proximal half of the right humerus. This specimen is (*Fig.*) of enormous size, and is figured by Falconer and Cautley, *op. cit.* pl. xlviii. figs. 1, 1 *a*, 1 *b*, as of the left side.
Presented by the Secretary of State for India, 1860.

M. 3106. The proximal part of the right radius. Figured by (*Fig.*) Falconer and Cautley, *op. cit.* pl. lvi. figs. 3, 3 *a*.

M. 3105. The distal portion of the right femur. Figured by Fal- (*Fig.*) coner and Cautley, *op. cit.* pl. lvi. figs. 1, 1 *a*, 1 *b*, 1 *c*.

M. 3106 a. The distal portion of the right tibia. Figured by Fal- (*Fig.*) coner and Cautley, *op. cit.* pl. lvi. figs. 2, 2 *a*.

M. 3268. The left calcaneum. Figured by Falconer and Cautley, (*Fig.*) *op. cit.* pl. lv. figs. 1, 1 *a*, 1 *b*, 1 *c*.

M. 3108. A dorsal vertebra. Figured by Falconer and Cautley, (*Fig.*) *op. cit.* pl. lvi. figs. 4, 4 *a*, 4 *b*.

Elephas columbi, Falconer[1].

Syn. *Elephas texianus*, Owen[2].
? *Elephas jacksoni*, Mather[3].
? *Elephas americanus*, De Kay[4].
? *Elephas imperator*, Leidy[5].
Euelephas columbi, auct.

The molars of this imperfectly known species were regarded by Falconer as being intermediate between those of *E. antiquus* and *E. indicus*; there are, however, certain thin-ridged molars, said to be from the same deposits, which are indistinguishable from those of *E. primigenius*, and are accordingly included under that head. The type molars are thick-ridged, and characterized by the antero-posterior expansion of the basal extremities of the ridges; the

[1] Quart. Journ. Geol. Soc. vol. xiii. table facing p. 319 (1857).
[2] Rep. Brit. Assoc. for 1858, Address, p. lxxxvi (1859).
[3] Amer. Journ. vol. xxxiv. p. 363 (1838).
[4] Nat Hist. of New York (Zool.), vol. i. p. 101 (1842). The identity of this and the following three forms with *E. columbi* is given on the authority of Leidy, although it does not appear certain whether one or more of them may not really be equivalent to *E. primigenius*. The second name is preoccupied by Cuvier's *E. americanus* = *Mastodon americanus*.
[5] Proc. Ac. Nat. Sci. Philad. for 1858, p. 10.

enamel is much plicated and the wear of the crowns uneven. It has been suggested that the species is identical with *E. indicus*, but this is improbable on distributional grounds.

Hab. Central and North America.

20702 g. Fragment of the left maxilla, containing the anterior part of m. 3; said to have been obtained from the Pleistocene of the Brazos river, San Felipe de Austen, Texas. This and the following specimens, purchased at the same time, were collected by Mr. W. Huff; but Falconer seems to have had some doubt whether their reputed place of origin is the correct one. *Purchased*, 1847.

20702 d. Hinder half of a third upper true molar in an unworn condition; from San Felipe de Austen. *Purchased*, 1847.

40843. Cast of the middle portion of the third right upper true molar. The original is said to have been obtained from the Pleistocene in the neighbourhood of the Gulf of Mexico, and is described and figured by Warren in his 'Memoir on *Mastodon giganteus*,' p. 162, pl. xxviii. A (1852); it is also described by Falconer in the 'Nat. Hist. Rev.' 1863, p. 55, and in the 'Palæontological Memoirs,' vol. ii. p. 275. *Presented by C. Falconer, Esq.*, 1867.

20702 e. Hinder half of a partially-worn third upper true molar; from San Felipe de Austen. *Purchased*, 1847.

20702 a. Portion of a third upper true molar; from San Felipe de Austen. *Purchased*, 1847.

M. 80. Part of a small third upper true molar; from the Pleistocene of the north of Mexico.
Presented by H. H. Howorth, Esq., 1881.

20702 f. Hinder half of a partially-worn first or second upper true molar; from San Felipe de Austen. *Purchased*, 1847.

20702 b. Fragment of a molar; from San Felipe de Austen.
Purchased, 1847.

1331. Fragment of a well-worn molar; from the Pleistocene of South Carolina. *Sloane Collection. Purchased about* 1754.

33218. (*Fig.*) The well-worn third right lower true molar; from San Felipe de Austen. Described and figured by Blake in the 'Geologist,' vol. v. p. 57, pl. iv. (as *E. texianus*), and also

described by Falconer in the 'Nat. Hist. Rev.' 1863, p. 52, and in the 'Palæontological Memoirs,' vol. ii. p. 222.
Purchased. About 1858.

20702. The third right lower true molar; from San Felipe de Austen. Described in the 'Nat. Hist. Rev.' 1863, p. 53, and in the 'Palæontological Memoirs,' vol. ii. pp. 223, 224. *Purchased*, 1847.

40769. (*Fig.*) The greater part of the second right lower true molar which has been longitudinally and vertically bisected; from the Pleistocene of the Brunswick canal, Darien, Georgia. Described and figured in the 'Nat. Hist. Rev.' 1863, p. 52, pl. i., and in the 'Palæontological Memoirs,' vol. ii. pp. 221, 222, pl. x. fig. 1. *Presented by C. Falconer, Esq.*, 1867.

20702 c. The posterior two-thirds of the second left lower true molar; from San Felipe de Austen. Described in the 'Nat. Hist. Rev.' 1863, p. 54, and in the 'Palæontological Memoirs,' vol. ii. p. 224. *Purchased*, 1847.

M. 80 a. Five ridges of a lower molar; from the north of Mexico. *Presented by H. H. Howorth, Esq.*, 1881.

20700. Fragment of the anterior portion of the right ramus of the mandible, showing part of the alveolus of a molar; from San Felipe de Austen. *Purchased*, 1847.

20705. The greater part of the right ramus of the mandible, showing the alveolus of $\overline{m.3}$; from San Felipe de Austen. Noticed in the 'Nat. Hist. Rev.' 1863, p. 57, and in the 'Palæontological Memoirs,' vol. ii. p. 228.
Purchased, 1847.

20700 a. Fragment of a mandibular ramus; from San Felipe de Austen. *Purchased*, 1847.

20700 b. The glenoidal extremity of the left scapula; from San Felipe de Austen. *Purchased*, 1847.

20703. The proximal epiphysis of the right humerus; from San Felipe de Austen. *Purchased*, 1847.

20704. An acetabulum; from San Felipe de Austen.
Purchased, 1847.

20704 a. Part of the proximal portion of a femur; from San Felipe de Austen. *Purchased*, 1847.

20708. Two specimens of one half of the atlas vertebra; from San Felipe de Austen. *Purchased*, 1847.

Elephas armeniacus, Falconer [1].

Syn. *Euelephas armeniacus*, auct.

This species is definitely known only by the following specimens, which belong to an animal of very large size. The structure of the molars indicates a species intermediate between *E. primigenius* and *E. indicus*, which is probably an ancestral form closely connected with both [2]. The crowns of the molars are extremely wide, the ridges approximated, with their extremities curving backwards, the enamel is moderately thick and much plicated, and the wear of the crown irregular. In their great width these teeth agree with those of *E. primigenius*, but in the other characters with those of *E. indicus* [3].

Hab. Armenia. It is stated in 'Falconer's Palæontological Memoirs,' vol. ii. pp. 249, 250, that Falconer was inclined to refer certain Italian and Sicilian molars to the present species. A molar from China identified by Busk [4] with this species is referred in this Catalogue (p. 169) to *E. namadicus*. All the following specimens appear to have belonged to the same individual.

32250–1. (*Fig.*) The associated right and left third upper true molars; from Kanus, Erzerum, Armenia, their geological age being unknown [5]. These and the following specimens are the types of the species. They are described by Falconer in the 'Nat. Hist. Rev.' 1863, p. 75, the left tooth being figured in pl. ii. fig. 2 of the same memoir; and also in 'Falconer's Palæontological Memoirs,' vol. ii. pp. 247–284, pl. x. fig. 3. *Presented by Col. J. M. Giels*, 1855.

32252. The anterior portion of the third (?) lower true molar; from Kanus. Noticed by Falconer, *loc. cit.*
Presented by Col. J. M. Giels, 1855.

32256. Part of the outer lamina of an incisor; from Kanus. This specimen is of enormous size; noticed by Falconer, *loc. cit.*
Presented by Col. J. M. Giels, 1855.

32254. Head of a humerus; from Kanus.
Presented by Col. J. M. Giels, 1855.

32253. Fragment of the shaft of a tibia; from Kanus.
Presented by Col. J. M. Giels, 1855.

[1] Quart. Journ. Geol. Soc. vol. xiii., table facing p. 319 (1857).
[2] *Ibid.* vol. xlii. p. 174 (1886).
[3] See Leith-Adams, 'British Fossil Elephants' (Mon. Pal. Soc.), p. 241.
[4] Quart. Journ. Geol. Soc. vol. xxiv. p. 498 (1868).
[5] *Ibid.* vol. xlii. p. 174.

Elephas primigenius, Blumenbach [1].

Syn. *Euelephas primigenius*, auct.

The ridge-formula of the molars (exclusive of talons) may be approximately given as MM. $\frac{(3\text{–}4)\,.\,(6\text{–}9)\,.\,(9\text{–}12)}{(3\text{–}4)\,.\,(6\text{–}9)\,.\,(9\text{–}12)}$, M. $\frac{(9\text{–}15)\,.\,(14\text{–}16)\,.\,(18\text{–}27)}{(9\text{–}15)\,.\,(14\text{–}16)\,.\,(18\text{–}27)}$. The frontal aspect of the cranium is elongated, the incisive alveoli are long and divergent, the temporal fossæ intrude largely on to the frontal aspect, and the interval between the narial aperture and the vertex is very great, the symphysial channel of the mandible being very wide and short. In general contour the cranium agrees very closely with that of *E. indicus*, but is relatively narrower. The incisors are usually long, spiral, and not very thick near the alveolus; they are, however, subject to great variation. The molars are relatively wide in proportion to their length; their ridges are narrow and closely packed, with the cement, enamel, and dentine very thin; the plication of the enamel is usually slight; the worn dentine-disks are very narrow; and the crown is usually characterized by the extreme flatness of its wear. Variations are common, and those molars in which the ridges are thicker and less numerous and the enamel more plicated approach very closely to certain examples of *E. antiquus*. The existing Indian species presents a close approach in dental and skeletal structure, but the molars are decidedly of a less specialized type, and thereby indicate that the living species is not a descendant of the Mammoth. *E. armeniacus*, as mentioned above, is intermediate between the two in respect of molar-structure, although nearer to *E. indicus*.

Hab. Northern Europe, Asia, and America. In England the species first appears in the Norfolk Forest-bed [2], and continues throughout the whole of the Pleistocene; if, therefore, the view of including the Forest-bed in the Pleistocene be followed, the species may be considered characteristic of that period.

*. (*Fig.*) The cranium, with the well-worn m. 3 of either side *in situ*; from Ilford, Essex. Described and figured by H. Woodward in the 'Geol. Mag.' dec. ii. vol. v. p. 544, pls. xxii., xxiii. (1868), and by Leith-Adams in his 'British Fossil Elephants' (Mon. Pal. Soc.), p. 128, pls. vi. & vii. The right side has been partly restored, the right incisor having been found detached. *Presented by W. Hill, Esq.*, 1864.

[1] Handbuch der Naturgeschichte, 1st French ed. vol. ii. p. 407 (1803).

[2] See Leith-Adams, 'British Fossil Elephants' (Mon. Pal. Soc.) p. 173.

27938. Part of the occiput; probably from one of the eastern counties. *Presented by John Brown, Esq.*, 1852.

45009. The basioccipital and adjacent bones; from Ilford. *Brady Collection. Purchased*, 1878.

45010. Part of the sphenoid; from Ilford. *Brady Collection. Purchased*, 1878.

20701. Fragment of a right maxilla with m. 3, probably belonging to this species; said to have been obtained from the Pleistocene of the Brazos river, near San Felipe de Austen, Texas, U.S.A. This specimen is of enormous size, and is described by Falconer in the 'Nat. Hist. Rev.' 1863, p. 58, and in the 'Palæontological Memoirs,' vol. ii. p. 228, where it is stated to be indistinguishable from teeth of the present species. *Purchased*, 1847.

24585. Part of the palatal region of the cranium, showing a fragment of the right m. 2 and the complete left m. 3; from Kotzebue Sound, Eschscholtz Bay, Alaska. Noticed by Leith-Adams, *op. cit.* p. 115[1]. *Presented by Captain Kellet and Lieut. Wood, R.N.*, 1850.

M. 3397. Part of the palate, showing a fragment of the left m. 2 and the complete m. 3 of either side; from Bergstrasse near Heidelberg. *Purchased.*

M. 3399. Part of the right maxilla containing m. 2; British, locality unknown. *No history.*

46141. Fragment of the right maxilla with m. 1 or m. 2; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

44931. The palate, containing the well-worn m. 1 of both sides; from Ilford. Noticed by Leith-Adams, *op. cit.* p. 99. *Brady Collection. Purchased*, 1878.

M. 1576. Part of the palate, with the much-worn mm. 4 of both sides; from Ilford. This specimen belongs to the same individual as the mandible, No. M. 1576 *a* (p. 195). *Presented by C. Westendarp, Esq.*, 1884.

41949. Fragment of the right maxilla, showing mm. 4, which has twelve ridges; from Ilford. *Brady Collection. Purchased*, 1878.

44737. The palate, showing mm. 4 of both sides and the left mm. 3; from Hutton cave, Mendip Hills. The first four ridges of

[1] Wrongly stated to have been presented by Captain Beechey.

mm. 4 are worn, and the alveolus and part of the roots of the right mm. 3 remain.

Presented by B. Bright, Esq., 1873.

Fig. 30.

Elephas primigenius.—Part of the palate, showing the right mm. 2 (*d.* 1) and mm. 3 (*d.* 2); from Creswell Crags, Derbyshire. ½. *a.* The anterior root of mm. 2. (From the Quart. Journ. Geol. Soc.)

46140. The palate, containing the well-worn mm. 4 of either side; dredged off the eastern coast. Noticed by Leith-Adams, *op. cit.* p. 95. *Owles Collection. Purchased*, 1874.

36777. The palate, showing the much-worn mm. 3 on the left, and the germ of mm. 4 on both sides; from Ilford.
Purchased, 1862.

44955. Fragment of the palatal region, showing the much-worn mm. 3 or mm. 4 of both sides; from Ilford.
Brady Collection. Purchased, 1878.

50087. The palate, showing the well-worn mm. 4 and the germ of m. 1 on both sides; from Ilford. *Purchased*, 1879.

M. 1978. (*Fig.*) Part of the palate of a very young individual, showing the right mm. 2 and mm. 3; from a cavern in Creswell Crags, Derbyshire. Described and figured by Owen in the 'Quart. Journ. Geol. Soc.' vol. xli. p. 32, figs. 1, 2, and by Metcalfe in the 'Journ. Derb. Arch. Soc.' 1885, pl. vi.; the figures being reproduced in the accompanying woodcut (fig. 30). *Presented by A. T. Metcalfe, Esq.*, 1885.

M. 3389. Cast of a tooth regarded as the first milk-molar. The original was obtained from Kent's Cavern, Torquay, Devonshire, and is figured in Leith-Adams's 'British Fossil Elephants,' pl. ix. figs. 4, 4*a*.
Presented by Prof. Leith-Adams.

A first (?) milk-molar; from Grays, Essex.
Purchased, 1849.

44963–4. Two much-worn third upper milk-molars; from Ilford.
Brady Collection. Purchased, 1878.

37251. Two specimens (one imperfect) of the third upper milk-molar; from Orford, Suffolk. *Purchased*, 1863.

27912. Part of a third upper milk-molar; from Heddingham, Essex. *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1859.

43640. The slightly-worn third right upper milk-molar; from the fissures of Oreston, near Plymouth, Devonshire.
Purchased. About 1852.

14999. The third left upper milk-molar; from Kent's Cavern.
McEnery Collection. Purchased, 1842.

15000. The third left upper milk-molar; from Kent's Cavern. (*Fig.*) Figured in McEnery's 'Cavern Researches,' pl. M. fig. 3. *McEnery Collection. Purchased*, 1842.

46422. The third right upper milk-molar; from Wookey Cave, (*Fig.*) Somersetshire. Figured in Leith-Adams's 'British Fossil Elephants,' pl. x. figs. 3, 3 *a*. *Purchased*, 1875.

44733. The third right upper milk-molar; from Hutton Cave, Mendip Hills. Noticed in Leith-Adams's 'British Fossil Elephants,' p. 91. *Presented by B. Bright, Esq.*, 1873.

15002. A slightly-worn fourth right upper milk-molar; from Kent's Cavern. *McEnery Collection. Purchased*, 1842.

15003. The well-worn fourth left upper milk-molar; from Kent's Cavern. *McEnery Collection. Purchased*, 1842.

15004. The fourth right upper milk-molar; from Kent's Cavern. *McEnery Collection. Purchased*, 1842.

15006. A partially-worn fourth left upper milk-molar; from Kent's Cavern. Noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 160. *McEnery Collection. Purchased*, 1842.

18982. A small and well-worn fourth right upper milk-molar; from Kent's Cavern.
Presented by Rev. Upton Richards, 1845.

18982 a. The imperfect germ of a fourth upper milk-molar; from Kent's Cavern.
Presented by Rev. Upton Richards, 1845.

M. 453. A slightly-worn fourth left upper milk-molar of large size; from Kent's Cavern.
Enniskillen Collection. Purchased, 1882.

36430. The fourth right upper milk-molar; from Heddingham.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

37282. The fourth right upper milk-molar; from Heddingham.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

20238. A fourth upper milk-molar; from Ilford.
Purchased, 1846.

20809. The imperfect fourth upper milk-molar of both sides; from Ilford. *Purchased*, 1847.

37284. A small specimen of the fourth right upper milk-molar, in a comparatively early stage of wear; from Ilford.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

44950. The fourth upper milk-molar of both sides, in an early stage of wear; from Ilford. Noticed by Leith-Adams, *op. cit.* p. 95 (as No. 20); each tooth has ten ridges and talons.
Brady Collection. Purchased, 1878.

44951–2. The fourth upper milk-molar of both sides; from Ilford.
Brady Collection. Purchased, 1878.

44954. The fourth left upper milk-molar, in a comparatively early stage of wear, and showing eleven ridges; from Ilford.
Brady Collection. Purchased, 1878.

44956. The fourth left upper milk-molar, in a well-worn condition; from Ilford. *Brady Collection. Purchased*, 1878.

44957. The last six ridges of the well-worn fourth left upper milk-molar; from Ilford.
Brady Collection. Purchased, 1878.

44959. A well-worn fourth upper milk-molar; from Ilford.
Brady Collection. Purchased, 1878.

44960–2. Three well-worn fourth upper milk-molars; from Ilford.
Brady Collection. Purchased, 1878.

44965. The slightly-worn fourth left upper milk-molar; from Ilford.
Brady Collection. Purchased, 1878.

44983. The anterior portions of the almost unworn fourth upper milk-molar of either side; from Ilford.
Brady Collection. Purchased, 1878.

45002, 3, 6. Three very much-worn fragments of fourth upper milk-molars; from Ilford.
Brady Collection. Purchased, 1878.

23716. The well-worn fourth upper milk-molar of both sides; from Slade Green, Erith, Kent. *Purchased*, 1849.

M. 2005. A well-worn fourth right upper milk-molar, of rather large size; from Kingsland, Hoxton, Middlesex.
No history.

37252. The fourth right upper milk-molar, in a very early stage of wear; from Orford, Suffolk. *Purchased*, 1863.

36428. The fourth left upper milk-molar, imperfect posteriorly; from Ipswich, Suffolk.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

M. 359. The fourth left upper milk-molar; from the neighbourhood of Oxford. *Egerton Collection. Purchased*, 1882.

12 (O.C.). A slightly-worn fourth upper milk-molar, with the cement denuded; from Stratford-on-Avon, Warwickshire.
Sloane Collection. Purchased, about 1754.

21272. A partially-worn fourth left upper milk-molar; from Eppelsheim, Hessen-Darmstadt. Noticed by Leith-Adams, *op. cit.* p. 95. *Purchased*, 1847.

44944. The first (?) left upper true molar; from Ilford.
Brady Collection. Purchased, 1878.

44945. The first left upper true molar, with twelve ridges; from Ilford. *Brady Collection. Purchased*, 1878.

44953. The first left upper true molar, in an early stage of wear; from Ilford. There are twelve ridges.
Brady Collection. Purchased, 1878.

44989. The well-worn first upper true molar of either side; from Ilford. *Brady Collection. Purchased*, 1878.

33593. The first right upper true molar; from Battersea, Surrey. Noticed by Leith-Adams, *op. cit.* p. 99.
Purchased, 1859.

40876. The first right upper true molar; probably from the Thames Valley. *Presented by C. Falconer, Esq.*, 1867.

23716 e. The first left upper true molar; from Slade Green.
Purchased, 1849.

46211. (*Fig.*) The much-worn first right upper true molar; dredged off the Dogger Bank. Described and figured by Leith-Adams, *op. cit.* p. 99, pl. xi. fig. 2.
Owles Collection. Purchased, 1874.

46200. The first left upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46206. The first left upper true molar, in a half-worn condition; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46210. The first left upper true molar, in a much-worn condition; dredged off the eastern coast. This specimen shows the great width of the dentine disks characteristic of much-worn teeth. *Owles Collection. Purchased*, 1874.

44736. The first upper true molar of both sides; from Hutton Cave.
Presented by B. Bright, Esq., 1873.

33341. A slightly-worn first upper true molar; locality unknown.
Layton Collection. Purchased, 1858.

28514. The first right upper true molar; dredged.
Dixon Collection. Purchased, 1853.

M. 124. The well-worn first left upper true molar; from Valjero, near the river Gradatz, south of Belgrade, Servia.
Purchased, 1881.

37293. The first left upper true molar; from Moscow, Russia. Noticed by Leith-Adams, *op. cit.* p. 101.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

46149. The first or second left upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46150. The first or second left upper true molar, imperfect posteriorly; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

23115. The second upper true molar of both sides; from Maidstone, Kent. Described by Leith-Adams, *op. cit.* p. 104.
Purchased, 1849.

37115. The second right upper true molar; from Erith, Kent.
Purchased, 1863.

44943. The second left upper true molar; from Ilford. There are thirteen ridges, of which ten are worn.
Brady Collection. Purchased, 1878.

46147. (*Fig.*) The second left upper true molar, in an early stage of wear; dredged off the Dogger Bank. Figured by Leith-Adams, *op. cit.* pl. ix. figs. 1, 1 *a*.
Owles Collection. Purchased, 1874.

46157. The second right upper true molar; from the eastern coast.
Owles Collection. Purchased, 1874.

46172. The second right upper true molar; from the eastern coast.
Owles Collection. Purchased, 1874.

46218. A large second left upper true molar, provisionally referred to this species; dredged off the eastern coast. The ridges are relatively wide and the enamel is deeply grooved, as in *E. antiquus*. *Owles Collection. Purchased*, 1874.

M. 452 a. The second left upper true molar; locality unknown.
Enniskillen Collection. Purchased, 1882.

M. 452. The second left upper true molar; from Church Cliff, Lyme Regis, Dorsetshire.
Enniskillen Collection. Purchased, 1882.

21272 a. The second left upper true molar; from Eppelsheim. Noticed by Leith-Adams, *op. cit.* p. 105. *Purchased*, 1847.

33328. A slightly-worn third right upper true molar, of very large size and imperfect anteriorly; dredged off the Norfolk coast. Noticed by Leith-Adams, *op. cit.* p. 118.
Layton Collection. Purchased, 1858.

33335. Hinder half of the third right upper true molar; probably from Norfolk. *Layton Collection. Purchased*, 1858.

33342. Part of a third upper true molar; from chalk débris at Horstead, Norfolk (see Woodward's 'Geology of Norfolk,' p. 50). *Layton Collection. Purchased*, 1858.

33353. The well-worn third left upper true molar; dredged off Happisburgh, Norfolk.
Layton Collection. Purchased, 1858.

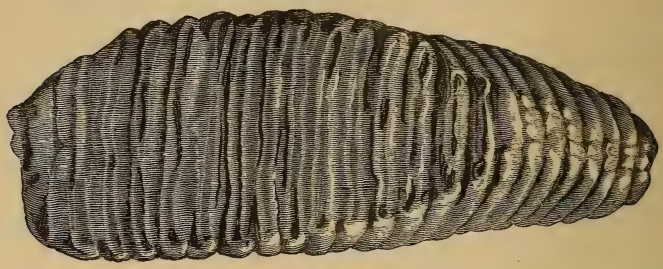
46142. The third left upper true molar; dredged off the Dogger Bank. Noticed by Leith-Adams, *op. cit.* p. 114.
Owles Collection. Purchased, 1874.

46143. The third right upper true molar, of very large size and about one-third worn; dredged off the Dogger Bank. This very fine example of the thin-ridged variety is noticed by Leith-Adams, *op. cit.* p. 115.
Owles Collection. Purchased, 1874.

46144. The third left upper true molar (fig. 31); dredged off the Dogger Bank. *Owles Collection. Purchased*, 1874.

(*Fig.*)

Fig. 31.



Elephas primigenius.—The third left upper true molar; dredged off the Dogger Bank. ⅓. The lower border of the figure is the inner border of the specimen.

46145. The third left upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46148. A distorted specimen of the third left upper true molar; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46151. A much-worn small third right upper true molar; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46152. The third left upper true molar, in a very early stage of wear and slightly imperfect posteriorly; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46153. Middle portion of the third right upper true molar; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46155. The third left upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46158. The third left upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46160. A small third right upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46162. A small third right upper true molar; dredged off the eastern coast. Noticed by Leith-Adams, *op. cit.* p. 113.
Owles Collection. Purchased, 1874.

46165. The third right upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46167. The third left upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46170. The slightly-worn third right upper true molar; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46173. The third right upper true molar, imperfect posteriorly; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46174. The third right upper true molar, imperfect posteriorly; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46175. The third right upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46178. A small third right upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46181. The third right upper true molar, imperfect posteriorly; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46185. A small specimen of the third right upper true molar; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46189. A well-worn small third left upper true molar, with very thin ridges; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46190. The third right upper true molar; dredged off the eastern coast. The outer extremities of the ridges are much deflected backwards. *Owles Collection. Purchased*, 1874.

46226. The well-worn third left upper true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46934. A very much worn third (?) right upper true molar, provisionally referred to this species; from the Forest-bed of Norfolk. *Purchased*, 1876.

32359. A much-worn third upper true molar; from Clapton, Middlesex. *Purchased. About* 1857.

37248–9. The third upper true molar of both sides; dredged from (*Fig.*) the Thames off Millbank. The right tooth is described and figured by Leith-Adams, *op. cit.* p. 113, pl. xiv. fig. 1.
Purchased, 1863.

38799. Two fragments of much-worn upper true molars of opposite sides; from Peckham, Surrey. *Purchased*, 1865.

M. 250. The much-worn third upper true molar of either side; from Lower Tooting, Surrey. *Purchased*, 1882.

18789 b. The third left upper true molar; locality unknown.
Presented by the Earl of Aylesford, 1845.

40559. The half-worn third right upper true molar; from the valley of the Medway, Kent. Noticed by Leith-Adams, *op. cit.* p. 113. *Purchased*, 1867.

37116. An imperfect third upper true molar; from Erith, Kent.
Purchased, 1863.

37116 a. Part of the third left upper true molar; from Erith.
Purchased, 1863.

23718 e. The third left upper true molar; from Slade Green, Erith.
Purchased, 1849.

23719 e. Two imperfect third upper true molars; from Slade Green.
Purchased, 1849.

M. 57. A small third left upper true molar; from Maidstone, Kent.
Purchased, 1880.

40839. The third left upper true molar; probably from Maidstone.
Presented by C. Falconer, Esq., 1867.

45819. The third left upper true molar of a small individual; from Chatham, Kent. There are twenty ridges, of which the first twelve are worn.
Brady Collection. Purchased, 1878.

M. 360. Fragment of a small third (?) upper true molar; from Bostal, near Rochester, Kent.
Egerton Collection. Purchased, 1882.

44932. The third upper true molar of both sides; from Ilford. There are nineteen ridges.
Brady Collection. Purchased, 1878.

44933. The third right upper true molar; from Ilford.
Brady Collection. Purchased, 1878.

44934. The third right upper true molar; from Ilford.
Brady Collection. Purchased, 1878.

44935. The third left upper true molar; from Ilford.
Brady Collection. Purchased, 1878.

44936. The third left upper true molar, containing eighteen ridges; from Ilford. *Brady Collection. Purchased*, 1878.

44937. The third left upper true molar, with nineteen ridges; from Ilford. *Brady Collection. Purchased*, 1878.

44938. The third left upper true molar, in a well-worn condition; from Ilford. *Brady Collection. Purchased*, 1878.

44939. The imperfect third (?) right upper true molar; from Ilford.
Brady Collection. Purchased, 1878.

44940. The imperfect third left upper true molar; from Ilford.
Brady Collection. Purchased, 1878.

44941. The imperfect third (?) left upper true molar; from Ilford.
Brady Collection. Purchased, 1878.

44942. A small specimen of the third (?) left upper true molar; from Ilford. *Brady Collection. Purchased*, 1878.

44996. The very much worn third (?) upper true molar of either side; from Ilford. *Brady Collection. Purchased*, 1878.

40704. A small third left upper true molar; from Ilford.
Purchased, 1867.

41081. The third upper true molar of either side; from the Isle-of-Dogs, Essex. Noticed by Leith-Adams, *op. cit.* p. 80.
Purchased, 1868.

36420. The slightly-worn third right upper true molar; dredged off Walton-on-the-Naze, Essex. Noticed by Leith-Adams, *op. cit.* p. 113. *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1859.

27943. The slightly-worn third left upper true molar, imperfect posteriorly; from Walton.
Presented by John Brown, Esq., 1852.

36426. (*Fig.*) The third upper true molar of both sides; from Lexden, near Colchester, Essex. These specimens are of small size, and are described by Leith-Adams, *op. cit.* p. 110, the right tooth being figured in pl. xiv. fig. 2.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

36291. A small third right upper true molar; from Lamarsh, Essex. Noticed by Leith-Adams, *op. cit.* p. 111.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

37276. A small third upper true molar; from Ballingdon, Essex. Noticed by Leith-Adams, *op. cit.* p. 119.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

27918. The hinder part of the well-worn third left upper true molar; from Ballingdon.
Presented by John Brown, Esq., 1852.

48938. The third left upper true molar, with much of the cement disintegrated; from Barnwell, near Cambridge.
Purchased, 1878.

27908. The third left upper true molar; from Ipswich, Suffolk. Noticed by Leith-Adams, *op. cit.* p. 113.
Presented by John Brown, Esq., 1852.

M. 456. Fragment of a much-worn upper true molar; from Southwold, Suffolk. *Enniskillen Collection. Purchased*, 1882.

M. 456 a. Fragment of a much-worn upper true molar; from Southwold. *Enniskillen Collection. Purchased*, 1882.

7230–2. The little-worn third upper true molar of both sides; from the 'Elephant-bed' at Brighton, Sussex. Noticed by Leith-Adams, *op. cit.* p. 118.
Mantell Collection. Purchased, 1836.

28514. The hinder part of a third upper true molar; probably from Brighton. *Dixon Collection. Purchased*, 1853.

43507. Part of a very wide third upper true molar; from Fenny Stratford, Buckinghamshire. Noticed by Leith-Adams, *op. cit.* p. 118.
Presented by Sir Philip Duncombe, Bart., 1872.

43508. Middle part of a third (?) upper true molar; from Fenny Stratford.
Presented by Sir Philip Duncombe, Bart., 1872.

M. 358. A small third right upper true molar; from Oxford.
Egerton Collection. Purchased, 1882.

43067. Middle portion of a rolled third upper true molar; from Lyme Regis, Dorsetshire. *Purchased*, 1871.

M. 382. Middle portion of a third upper true molar; from Freshwater, Isle of Wight.
Egerton Collection. Purchased, 1882.

47122. The third left upper true molar, of large size; from Kettering, Northamptonshire. Noticed by Leith-Adams, *op. cit.* p. 109. *Sharp Collection. Purchased*, 1876.

40383. The germ of the third left upper true molar, imperfect anteriorly; from Oundle, Northamptonshire. Noticed by Leith-Adams, *op. cit.* p. 118.
Presented by G. M. Edmonds, Esq., 1867.

M. 2552. The third right upper true molar; from Elton, near Peterborough, Northamptonshire. *Purchased*, 1885.

39695. (*Fig.*) A slightly-worn third upper true molar; from near Spalding, Lincolnshire. Described and figured by Leith-Adams, *op. cit.* p. 114, pl. ix. fig. 2. This specimen is very narrow.
Presented by Joseph Cubitt, Esq., 1866.

M. 58. The third right upper true molar; from Bickley, Knighton-on-Teme, Worcestershire. *Purchased*, 1880.

42276. The third upper true molar of either side, in a well-worn condition; from King's Newnham, near Rugby, Warwickshire. *Purchased*, 1870.

32263. The third left upper true molar; from a cavern near Wells, Somersetshire. *Presented by — Hodgkins, Esq.*, 1856.

46436. The third right upper true molar, imperfect posteriorly; from Chippenham, Wiltshire. *Purchased*, 1875.

37244. A distorted third upper true molar; from Eppelsheim, Hessen-Darmstadt. Noticed by Leith-Adams, *op. cit.* p. 121 (erroneously stated to be from Eschscholtz Bay).
Purchased, 1858.

21272 b. The third right upper true molar; from Eppelsheim. Noticed by Leith-Adams, *op. cit.* p. 112.
Purchased, 1847.

21272 c. Middle portion of the third right upper true molar; from Eppelsheim. *Purchased*, 1847.

M. 383. The third left upper true molar, with bent ridges; from Lauterburg, Alsace.
Egerton Collection. Purchased, 1882.

17 (O. C.). Fragment of a third upper true molar; from Cannstadt, Würtemburg. *Sömmering Collection. Purchased*, 1827.

M. 3410. Small fragment of a third upper true molar, with eight ridges remaining; from near Rioin, Puy-de-Dôme, France. The enamel is vertically grooved. *No history.*

M. 123. A third upper true molar; from Valjero, near the river Gradatz, south of Belgrade, Servia. *Purchased*, 1881.

M. 3409. The middle part of the third right upper true molar; from near Moscow, Russia. *Purchased. Before* 1850.

7406. Fragment of a worn upper true molar; from "Big-Bone-Lick," Kentucky, U.S.A. Noticed by Leith-Adams, *op. cit.* p. 122. *Mantell Collection. Purchased*, 1836.

M. 3396. The third right upper true molar; British, locality unknown. *No history.*

M. 2002. A third (?) upper true molar, vertically and longitudinally bisected; locality unknown. *No history.*

M. 2001. (*Fig.*) A third upper true molar, vertically and longitudinally bisected; from Kingsland, Middlesex. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. i. fig. 1, and in 'Falconer's Palæontological Memoirs,' vol. i. pl. v. fig. 3.
Presented by the Council of the Geological Society.

45012. A large, spirally curved, incisor; from Ilford.
Brady Collection. Purchased, 1878.

45013. A very similar incisor; from Ilford.
Brady Collection. Purchased, 1878.

45014. A long slender incisor, slightly curved; from Ilford.
Brady Collection. Purchased, 1878.

45015. The greater part of the proximal portion of a large incisor; from Ilford. *Brady Collection. Purchased*, 1878.

45017. Anterior portion of a small incisor; from Ilford.
Brady Collection. Purchased, 1878.

45018. A small incisor; from Ilford.
Brady Collection. Purchased, 1878.

45019. A small incisor; from Ilford.
Brady Collection. Purchased, 1878.

45020. Anterior portion of a small incisor; from Ilford.
Brady Collection. Purchased, 1878.

45023–4. The anterior portions of two incisors of young individuals; from Ilford. *Brady Collection. Purchased*, 1878.

M. 3402. An incisor; probably from the Arctic Regions. *Presented by the Lords of the Admiralty.*

46231–2. Two incisors; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46229. A small incisor; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

27897. A small incisor; from Clacton, Essex. *Presented by John Brown, Esq.*, 1852.

28024. Tip of an incisor; from Clacton. *Presented by John Brown, Esq.*, 1852.

32358. The greater part of an incisor; from Clacton. *Brown Collection. Presented by Prof. Sir R. Owen, K.C.B.*, 1859.

45816. An incisor; dredged off Harwich, Essex. *Brady Collection. Purchased*, 1878.

41660. An incisor; locality unknown. *Toulmin-Smith Collection. Purchased*, 1869.

46230. An incisor; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

43505. The right incisor; from Fenny Stratford, Buckinghamshire. Length 9 feet 8 inches. *Presented by Sir Philip Duncombe, Bart.*, 1872.

39472. The right incisor; dredged off the eastern coast between Happisburgh and Yarmouth. Length 10 feet. *Presented by Rev. G. J. Chester*, 1865.

33436. The left incisor; dredged off the Knoll Bank, twenty miles off Palling, Norfolk. The length is 9 feet 6 inches. Noticed in Owen's 'British Fossil Mammals and Birds,' p. 245. *Layton Collection. Purchased*, 1858.

M. 126. Part of a small incisor; labelled from "near Duboka in Save." *Purchased*, 1881.

M. 3390. Base of a very large incisor; from Siberia. *No history.*

M. 171. Fragment of a small incisor; from Behring's Straits. *Enniskillen Collection. Purchased*, 1882.

18 a (O. C.). The left incisor; from Eschscholtz Bay, Kotzebue Sound, Alaska. Figured in Beechey's 'Voyage to the Pacific and Behring's Straits in H.M.S. 'Blossom' during the years 1825 to 1828,' vol. ii. pl. ii. fig. 2 (1831). (*Fig.*)

Presented by Capt. F. W. Beechey, R.N.

M. 3401, 3403. Two incisors; from Eschscholtz Bay. *No history.*

M. 3393. The anterior part of an incisor; from Eschscholtz Bay.

No history.

24577. The right incisor; from Eschscholtz Bay. This specimen measures 12 feet 6 inches in length.

Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

24578. The right incisor; from Eschscholtz Bay.

Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

M. 3406. An incisor; (?) from the Arctic Regions.

Transferred from the Botanical Department in 1863.

46230–1. Two incisors; dredged off the eastern coast.

Owles Collection. Purchased, 1874.

M. 1620. Portions of incisors cut into ornaments; from Siberia.

Presented by C. Westendarp, Esq., 1884.

44917. Transverse section of one half of an incisor; from Siberia.

Purchased, 1874.

47403. Transverse section of an incisor; from Siberia.

Purchased, 1876.

M. 3404. The mandible (fig. 32), showing part of the much-worn $\overline{\text{m. 2}}$ and the slightly-worn $\overline{\text{m. 3}}$ of both sides; dredged off the Dogger Bank in 1837. Described and figured by Charlesworth in the Ann. Mag. Nat. Hist. ser. 2, vol. iii. p. 347, fig. 40 (1839), and figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiii. A. fig. 3. There are 18 ridges in $\overline{\text{m. 3}}$. (*Fig.*)

Purchased. About 1839.

32496. The mandible, containing $\overline{\text{m. 3}}$ of both sides; dredged off Harwich, Essex. Noticed by Leith-Adams, *op. cit.* p. 44.

Purchased. About 1857.

46193. Part of the right ramus of the mandible, containing $\overline{\text{m. 3}}$; dredged off the eastern coast.

Owles Collection. Purchased, 1874.

46196. The greater part of the mandible, showing a molar alveolus; dredged off the eastern coast.

Owles Collection. Purchased, 1874.

Fig. 32.

Elephas primigenius.—Mandible; dredged off the Dogger Bank, in the North Sea. Much reduced.

46208. The anterior portion of the mandible, showing the alveolus of a true molar; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

38136. Part of the mandible, showing the complete symphysis and the alveolus of $\overline{\text{m. 3}}$ of both sides; found in 1864 in digging the main drainage sewer in London. *Presented by the Commissioners of the Metropolitan Board of Works*, 1864.

1 a (O. C.). (*Fig.*) The imperfect mandible, containing the well-worn $\overline{\text{m. 3}}$ of either side; from Eschscholtz Bay, Kotzebue Sound. Figured in Beechey's 'Voyage to the Pacific and Behring's Straits in H.M.S. 'Blossom' during the years 1825 to 1828,' vol. ii. pl. i. figs. 1, 2.
Presented by Capt. F. W. Beechey, R.N.

1 (O. C.). Greater part of the mandible, showing the well-worn left $\overline{\text{m. 3}}$, and the alveolus of the opposite tooth; from Siberia.
Presented by Sir J. Banks, Bart., to whom it had been sent by the Emperor Alexander of Russia.

42924. Part of the mandible, showing the left $\overline{\text{m. 3}}$; from Holland.
Van Breda Collection. *Purchased*, 1871.

M. 3398. The mandible, containing $\overline{\text{m. 3}}$ in an early stage of wear; from Bergstrasse, near Heidelberg. *Purchased.*

23714. The greater portion of the mandible, showing $\overline{\text{m. 3}}$, the left one incomplete; from Slade Green, Erith, Kent.
Purchased, 1849.

44979. The mandible, showing $\overline{\text{m. 3}}$ of either side; from Ilford.
(*Fig.*) Figured by Leith-Adams, *op. cit.* pl. viii. fig. 3.
Brady Collection. *Purchased*, 1878.

44980. The greater portion of the mandible, showing the half-worn $\overline{\text{m. 3}}$ of either side; from Ilford.
Brady Collection. *Purchased*, 1878.

44981. The greater part of the mandible, showing $\overline{\text{m. 3}}$ of both sides; from Ilford. There are nineteen ridges in the left tooth.
Brady Collection. *Purchased*, 1878.

36778. The greater part of the mandible, showing $\overline{\text{m. 3}}$ in a damaged condition; from Ilford.
Presented by Sir Antonio Brady, 1859.

44975. The mandible, showing the well-worn $\overline{\text{m. 2}}$ and the germ of
(*Fig.*) $\overline{\text{m. 3}}$ on both sides; from Ilford. The symphysis is figured by Leith-Adams, *op. cit.* p. 139, fig. 25 (as No. C. 45).
Brady Collection. *Purchased*, 1878.

44976. The mandible, showing part of the much-worn $\overline{\text{m. 2}}$ and the slightly-worn $\overline{\text{m. 3}}$ of both sides; from Ilford.
Brady Collection. *Purchased*, 1878.

38567. The greater part of the mandible, showing the well-worn
(*Fig.*) $\overline{\text{m. 2}}$ of both sides, and the greater part of the germ of the left $\overline{\text{m. 3}}$; dredged in Holyhead Harbour. The symphysis is figured by Leith-Adams, *op. cit.* p. 135, fig. 6.
Presented by the Hon. W. O. Stanley, 1864.

44978. Anterior portion of the mandible, showing the half-worn $\overline{\text{m. 2}}$ of both sides; from Ilford.
Brady Collection. *Purchased*, 1878.

46215. Part of the mandible, showing $\overline{\text{m. 2}}$ of either side: dredged off the eastern coast. *Owles Collection.* *Purchased*, 1874.

23715 e. The anterior portion of the mandible, showing the half-worn $\overline{\text{m. 2}}$ and the anterior part of the germ of $\overline{\text{m. 3}}$; from Slade Green, Erith. *Purchased*, 1849.

46197. The anterior portion of the mandible, showing the well-worn (*Fig.*) $\overline{\text{m. 2}}$ of either side; dredged off the Dogger Bank. The symphysis is figured by Leith-Adams, *op. cit.* p. 135, fig. 9. *Owles Collection. Purchased*, 1874.

44974. The nearly perfect mandible, showing $\overline{\text{m. 1}}$ and the germ of (*Fig.*) $\overline{\text{m. 2}}$ of both sides; from Ilford. Figured by Leith-Adams, *op. cit.* pl. viii. fig. 2, and woodcut p. 135, fig. 8. *Brady Collection. Purchased*, 1878.

44977. The greater portion of the mandible, showing $\overline{\text{m. 1}}$ and the alveolus of $\overline{\text{m. 2}}$ on both sides; from Ilford. Four ridges of the left $\overline{\text{m. 2}}$ still remain. Noticed by Leith-Adams, *op. cit.* p. 101. *Brady Collection. Purchased*, 1878.

46161. The anterior part of the left ramus of the mandible, showing the half-worn $\overline{\text{m. 1}}$; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46194. Part of the mandible, showing the right $\overline{\text{m. 1}}$; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

37110. Fragment of the left ramus of the mandible, with the first true molar; from Erith, Kent. *Purchased*, 1863.

44973. The nearly complete mandible, showing the well-worn $\overline{\text{m. 1}}$ on both sides; from Ilford. The teeth have twelve ridges. *Brady Collection. Purchased*, 1878.

44972. Part of the right ramus of the mandible, containing the slightly worn $\overline{\text{m. 1}}$; from Ilford. The tooth has thirteen ridges. *Brady Collection. Purchased*, 1878.

44982. The greater portion of the mandible, showing $\overline{\text{m. 1}}$ on either side; from Ilford. The molars are in a comparatively early stage of wear, and have twelve ridges. *Brady Collection. Purchased*, 1878.

M. 3395. The mandible, showing the well-worn $\overline{\text{m. 1}}$ and the germ (*Fig.*) of $\overline{\text{m. 2}}$ *in alveolo*, of both sides; from Worms, Hessen-Darmstadt. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiii. A. fig. 2. *Purchased.*

M. 1576 a. The mandible, showing the much-worn $\overline{\text{mm. 4}}$ and the germ of $\overline{\text{m. 1}}$ (*in alveolo*); from Ilford. This specimen belongs to the same individual as the palate No. M. 1576 (p. 176). *Presented by C. Westendarp, Esq.*, 1884.

50087 a. The mandible, containing the half-worn $\overline{\text{mm. 4}}$ and the germ of $\overline{\text{m. 1}}$ (*in alveolo*); from Ilford. This specimen belongs to the same individual as the portion of the cranium No. 50087 (p. 178). *Purchased*, 1879.

44969. Part of the left ramus of the mandible, with the well-worn $\overline{\text{mm. 4}}$, which has nine ridges; from Ilford.
Brady Collection. Purchased, 1878.

44970. Fragment of the left ramus of the mandible, with part of the germ of $\overline{\text{mm. 4}}$; from Ilford.
Brady Collection. Purchased, 1878.

44971. (*Fig.*) The anterior part of the mandible, containing $\overline{\text{mm. 4}}$; from Ilford. Figured by Leith-Adams, *op. cit.* pl. viii. fig. 1.
Brady Collection. Purchased, 1878.

21312. Part of the right ramus of the mandible, with the slightly-worn $\overline{\text{mm. 4}}$; from Ilford. *Purchased*, 1847.

M. 454. The symphysis and part of the left ramus of the mandible, showing $\overline{\text{mm. 4}}$ in an early stage of wear; from Ilford.
Enniskillen Collection. Purchased, 1882.

21830. (*Fig.*) The anterior part of the mandible, showing the alveoli of $\overline{\text{mm. 3}}$ and $\overline{\text{mm. 4}}$; dredged off the eastern coast. Described and figured in Owen's 'British Fossil Mammals and Birds,' p. 221, fig. 86. *Presented by John Brown, Esq.*, 1852.

43504. Cast of the mandible, showing the half-worn $\overline{\text{mm. 4}}$ of either side. The original was obtained from the neighbourhood of Lyons, France, and is preserved in the Lyons Museum. Noticed by Leith-Adams, *op. cit.* p. 97.
Presented by Dr. Lortet, Director of the Museum at Lyons, 1872.

27979. The symphysis of the mandible, showing the alveolus of (?) $\overline{\text{mm. 4}}$; probably from one of the eastern counties.
Presented by John Brown, Esq., 1852.

33403. Part of the right ramus of a mandible, provisionally referred to this species, showing the alveoli of $\overline{\text{mm. 3}}$ and $\overline{\text{mm. 4}}$; dredged off Happisburgh, Norfolk. Noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 161 (as containing alveoli of $\overline{\text{mm. 2}}$ and $\overline{\text{mm. 3}}$).
Layton Collection. Purchased, 1858.

28569. Part of the right ramus of the mandible, showing the alveoli of $\overline{\text{mm. 3}}$ and $\overline{\text{mm. 4}}$; from a cavern in Sundwig, Westphalia. *Purchased*, 1853.

44967. The anterior portion of the mandible, showing the alveolus (*Fig.*) of $\overline{\text{mm. 2}}$ and the almost unworn $\overline{\text{mm. 3}}$; from Ilford. Figured by Leith-Adams, *op. cit.* pl. x. fig. 1. There are six ridges and two talons in $\overline{\text{mm. 3}}$.

Brady Collection. Purchased, 1878.

44968. Part of the left ramus of the mandible, showing the alveolus of $\overline{\text{mm. 2}}$ and the germ of $\overline{\text{mm. 3}}$; from Ilford.

Brady Collection. Purchased, 1878.

21311. Part of the left ramus of the mandible, showing the alveoli (*Fig.*) of $\overline{\text{mm. 2}}$ and $\overline{\text{mm. 3}}$; from Ilford. Figured by Leith-Adams, *op. cit.* pl. x. fig. 2. *Purchased*, 1847

20806. Symphysis of a very young mandible; from Ilford.

Purchased, 1846.

46146. The third left lower milk-molar, in an early stage of wear; dredged off the eastern coast. There are six ridges and two talons. *Owles Collection. Purchased*, 1874.

44966, 45008. Two fragments of third lower milk-molars, one very much worn; from Ilford.

Brady Collection. Purchased, 1878.

44734. The third right lower milk-molar; from Hutton Cave, Men- (*Fig.*) dip Hills, Somersetshire. Figured by Leith-Adams, *op. cit.* pl. vi. figs. 2, 2 *a*. *Presented by B. Bright, Esq.*, 1873.

15001. An almost unworn third lower milk-molar; from Kent's (*Fig.*) Cavern, Torquay. Figured in McEnery's 'Cavern Researches,' pl. M. fig. 1, and by Leith-Adams, *op. cit.* pl. xiii. fig. 2. *McEnery Collection. Purchased*, 1842.

15001 a. A third lower milk-molar, vertically and longitudinally (*Fig.*) bisected; from Kent's Cavern. Figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis,' pl. xiv. figs. 3, 3 *a*. *McEnery Collection. Purchased*, 1842.

16814. A partially-worn third lower milk-molar with the cement (*Fig.*) partly scaled off; from Kent's Cavern. Figured in McEnery's 'Cavern Researches,' pl. M. fig. 2.

McEnery Collection. Purchased, 1842.

16815. A well-worn third lower milk-molar; from Kent's Cavern.

McEnery Collection. Purchased, 1842.

49124. A third lower milk-molar; locality unknown.

Purchased, 1878.

M. 2551. The well-worn fourth right lower milk-molar; from Elton, near Peterborough, Northamptonshire.
Presented by A. N. Leeds, Esq., 1885.

39041. (*Fig.*) The fourth lower milk-molar of both sides; from Brackle-sham Bay, Sussex. Described and figured by Leith-Adams, *op. cit.* p. 97, pl. xi. figs. 1, 1 *a*.
Bowerbank Collection. *Purchased*, 1851.

40792. The fourth lower milk-molar of both sides; probably from the Thames Valley. These teeth are but slightly worn and of small size. *Presented by C. Falconer, Esq.*, 1867.

21315 a. A fourth left lower milk-molar of the same size as the preceding; from Ilford. Noticed in 'Falconer's Palæontological Memoirs,' vol. ii. p. 162. *Purchased*, 1847.

44984. The imperfect fourth right lower milk-molar; from Ilford.
Brady Collection. *Purchased*, 1878.

44985. The much-worn fourth left lower milk-molar; from Ilford. There are twelve ridges.
Brady Collection. *Purchased*, 1878.

44986. A small fourth lower milk-molar, imperfect anteriorly; from Ilford. *Brady Collection.* *Purchased*, 1878.

44987. An almost unworn small fourth left lower milk molar, imperfect posteriorly; from Ilford.
Brady Collection. *Purchased*, 1878.

46201. The first right lower true molar, in a slightly more worn condition; dredged off the eastern coast.
Owles Collection. *Purchased*, 1874.

46202. The first right lower true molar, in a half-worn condition; dredged off the eastern coast.
Owles Collection. *Purchased*, 1874.

46204. The first left lower true molar; dredged off the eastern coast. *Owles Collection.* *Purchased*, 1874.

44990. The first lower true molar of either side, in a much-worn condition; from Ilford.
Brady Collection. *Purchased*, 1878.

44991. The first lower true molar of either side, in a rather less worn condition; from Ilford.
Brady Collection. *Purchased*, 1878.

44992. The almost unworn first right lower true molar; from Ilford. There are twelve ridges.
Brady Collection. *Purchased*, 1878.

21315. The imperfect first lower true molar of both sides; from Ilford. *Purchased*, 1847.

M. 124. The first left lower true molar; from Valjero, near the river Gradatz, south of Belgrade, Servia. *Purchased*, 1881.

M. 459. An imperfect first or second lower true molar; from the Lippe, Westphalia.
Enniskillen Collection. *Purchased*, 1882.

M. 361. A slightly imperfect first or second lower true molar; from Bonn, Rhenish Prussia.
Egerton Collection. *Purchased*, 1882.

46154. The second right lower true molar, in an early stage of wear; dredged off the eastern coast.
Owles Collection. *Purchased*, 1874.

46163. The second right lower true molar, in a rather more advanced stage of wear; dredged off the eastern coast.
Owles Collection. *Purchased*, 1874.

46188. The second left lower true molar, imperfect anteriorly; dredged off the eastern coast.
Owles Collection. *Purchased*, 1874.

40790. The second left lower true molar; from the Thames Valley. Noticed by Leith-Adams, *op. cit.* p. 105.
Presented by C. Falconer, Esq., 1867.

21315 a. The second lower true molar of both sides; from Ilford.
Purchased, 1847.

M. 2556. The much-worn second (?) left lower true molar; from Elton, near Peterborough.
Presented by A. N. Leeds, Esq., 1885.

37279. The hinder part of the second right lower true molar; from Heddingham. *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1859.

21272 d. The slightly-worn second right lower true molar; from Eppelsheim, Hessen-Darmstadt. *Purchased*, 1847.

46159. The third left lower true molar, of large size; from the Norfolk coast. This tooth is twisted posteriorly.
Layton Collection. *Purchased*, 1858.

49452. The third right lower true molar, of small size; dredged off the Norfolk coast. *Layton Collection. Purchased*, 1858.

40699. (*Fig.*) The third right lower true molar, of rather small size; dredged off Cromer, Norfolk. Described and figured by Leith-Adams, *op. cit.* p. 117, pl. xiv. fig. 3.
Purchased, 1867.

46164. The third right lower true molar; dredged off the eastern coast. The hind talon is laterally bent.
Owles Collection. Purchased, 1874.

46166. The third right lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46168. The third right lower true molar, in an early stage of wear; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46171. The third left lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46176. The third left lower true molar; dredged off the eastern coast. Noticed by Leith-Adams, *op. cit.* p. 117.
Owles Collection. Purchased, 1874.

46177. The third right lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46180. The hinder half of the third left lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46182. The third left lower true molar, imperfect posteriorly; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46183. The third left lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46184. The third right lower true molar, imperfect posteriorly; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46186. A small specimen of the third right lower true molar, in a well-worn condition; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46187. The third right lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46191. The third right lower true molar, in a well-worn condition; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46198. The imperfect third right lower true molar, with the cement scaled off; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46199. The third left lower true molar, with the cement scaled off, and imperfect anteriorly; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46203. A small third right lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46217. The third left lower true molar, in a much-worn condition; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46219. The well-worn third left lower true molar, with the cement partly scaled off; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46220. The third left lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46221. The hinder half of the third left lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46223. Hinder half of a third lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46227. The third left lower true molar, about half-worn; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46169. The third left lower true molar; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

37283. The third lower true molar of either side; from Ipswich, Suffolk. The ridges are bent backwards, near the middle.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

M. 460. Part of a well-worn second or third lower true molar; from Southwold, Suffolk.
Enniskillen Collection. Purchased, 1882.

46678. The third left lower true molar, wanting the two extremities; found 28 feet below the surface in digging the sewer along Pall Mall in 1731. Noticed by Leith-Adams, *op. cit.* p. 80.
Presented by the Council of the Society of Antiquaries, 1875.

45870. The imperfect third lower true molar of either side; found in digging the foundations of the Museum.
Presented by the First Commissioner of the Metropolitan Board of Works, 1874.

23117. A small third left lower true molar; from Maidstone, Kent.
Purchased, 1849.

37111. The imperfect third right lower true molar; from Erith, Kent. *Purchased*, 1863.

37112. The third left lower true molar, imperfect posteriorly; from Erith. *Purchased*, 1863.

40299. Middle portion of the well-worn third right lower true molar; from Crayford, Kent. *Purchased*, 1867.

36427. The third lower true molar of either side; from Lexden, near Colchester, Essex. These specimens are of small size, and belonged to the same individual as the corresponding upper teeth in No. 36426 (p. 187).
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

28976. The third right lower true molar; from near Brentford, Essex. Noticed by Leith-Adams, *op. cit.* p. 120.
Purchased, 1854.

43551. The third left lower true molar; from Walthamstow, Essex. Noticed by Leith-Adams, *op. cit.* p. 120. *Purchased*, 1872.

27911. An imperfect third lower true molar; from Heddingham, Essex. Noticed by Leith-Adams, *op. cit.* p. 106.
Presented by John Brown, Esq., 1852.

37280. The imperfect third left lower true molar; from Heddingham.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

37277. A small third left lower true molar, imperfect anteriorly: from Heddingham. *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1859.

21681. A small third left lower true molar, in an early stage of wear and imperfect posteriorly; from Grays, Essex.
Purchased, 1847.

37281. A small third left lower true molar, imperfectly posteriorly; from Walton, Essex. *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1859.

27917. The third left lower true molar; from Lamarsh, Essex. Noticed by Leith-Adams, *op. cit.* p. 80.
Presented by John Brown, Esq., 1852.

37278. The third right lower true molar, imperfect posteriorly; from Lamarsh. Noticed by Leith-Adams, *op. cit.* p. 80.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

M. 1604. The worn and imperfect third lower true molar of either side; from Ilford.
Presented by C. Westendarp, Esq., 1884.

44993. The imperfect germs of the third lower true molar of either side; from Ilford. *Brady Collection. Purchased*, 1878.

44994. The third left lower true molar; from Ilford.
Brady Collection. Purchased, 1878.

44995. The imperfect third true molar of either side, in a very early stage of wear; from Ilford.
Brady Collection. Purchased, 1878.

7218. An imperfect third lower true molar; from Brighton.
Mantell Collection. Purchased, 1836.

7229. The anterior half of a large third right lower true molar; from Brighton. Noticed by Leith-Adams, *op. cit.* p. 118.
Mantell Collection. Purchased, 1836.

7231. The third left lower true molar; from Brighton. The crown is unusually narrow and the ridges are very thin; noticed by Leith-Adams, *op. cit.* p. 118.
Mantell Collection. Purchased, 1836.

M. 59. An imperfect third lower true molar; from Bickley, Knighton-on-Teme, Worcestershire. *Purchased*, 1880.

16072. The third left lower true molar: from Northampton.
Purchased. About 1842.

47123. A small third left lower true molar; from near Peterborough, Northamptonshire. *Purchased*, 1876.

M. 2555. A very small third left lower true molar; from Elton, near Peterborough. *Presented by A. N. Leeds, Esq.*, 1885.

M. 482. Hinder portion of a third lower true molar; from Church Cliff, Lyme Regis, Dorsetshire.
Enniskillen Collection. Purchased, 1882.

43067. Hinder part of a rolled third lower true molar; from Lyme Regis. *Purchased*, 1871.

46441. The third left lower true molar; from Foxham, Wiltshire. *Purchased*, 1875.

46442. The hinder part of the third left lower true molar, showing bent ridges; from Broughton Gifford, Wiltshire. *Purchased*, 1875.

37292. The third right lower milk-molar; from a cutting on the Stowe-Valley railway. *Brown Collection.* *Presented by Prof. Sir R. Owen, K.C.B.*, 1859.

9 (O. C.). Part of a much-worn third (?) lower true molar; from Cannstadt, Würtemberg. *Sömmering Collection.* *Purchased*, 1827.

M. 458. An imperfect third right lower true molar; from Morseburg, Saxony. *Enniskillen Collection.* *Purchased*, 1882.

M. 460. The third right lower true molar; from the Lippe, Westphalia. *Enniskillen Collection.* *Purchased*, 1882.

21272 e. The third right lower true molar, imperfect posteriorly; from Eppelsheim, Hessen-Darmstadt. *Purchased*, 1847.

21488. The third left lower true molar; from Eppelsheim. *Purchased*, 1847.

M. 384. The third left lower true molar, imperfect posteriorly; from Dusseldorf, Germany. *Egerton Collection.* *Purchased*, 1882.

M. 1584. The third true molar of both sides; from Weimar, Germany. *Presented by C. Westendarp, Esq.*, 1884.

M. 3411. A small third right lower true molar; from Siberia. *No history.*

4 (O. C.). The third right lower true molar of the thick-ridged variety; from Siberia. Noticed by Leith-Adams, *op. cit.* p. 121. *Sloane Collection.* *Purchased, about* 1754.

44060. The third left lower true molar; from the Porcupine River, Canada. Noticed by Leith-Adams, *op. cit.* p. 117. *Presented by Rev. Robert McDonald*, 1873.

44061. A much-worn third right lower true molar, remarkable for its extremely narrow crown; from the Porcupine River. *Presented by Rev. Robert McDonald*, 1873.

2 a (O. C.). (*Fig.*) The well-worn third right lower rtue molar; from Eschscholtz Bay, Kotzebue Sound, Alaska. Described and figured in Beechey's 'Voyage to the Pacific and Behring's Straits in H.M.S. 'Blossom' during the years 1825 to 1828,' vol. ii. p. 596, pl. i. figs. 1–3 (1831).
Presented by Capt. F. W. Beechey, R.N.

M. 457. Part of a much-worn true molar; from Xanton on the Rhine. *Egerton Collection. Purchased*, 1882.

16 (O. C.). Fragment of a well-worn true molar; from Siberia, collected in 1818.
Sömmering Collection. Purchased, 1827.

40702. Fragment of a much-worn true molar; from the United States. *Purchased*, 1867.

The specific reference of some of the following specimens is provisional.

296 (O. C.). (*Fig.*) The left scapula; from Eschscholtz Bay. Figured in Beechey's 'Voyage,' vol. ii. pl. ii. fig. 8.
Presented by Capt. F. W. Beechey, R.N.

M. 3400. The imperfect right scapula; from Eschscholtz Bay.
No history.

24583. Two imperfect specimens of the left scapula; from Eschscholtz Bay.
Presented by Capt Kellet and Lieut. Wood, R.N., 1850.

36779. The left scapula; from Ilford.
Presented by Sir Antonio Brady, 1858.

45060. The left scapula; from Ilford.
Brady Collection. Purchased, 1878.

45061. The imperfect left scapula; from Ilford.
Brady Collection. Purchased, 1878.

44065. The imperfect left scapula of a young individual; from Ilford. *Brady Collection. Purchased*, 1878.

27873. The imperfect left scapula; from one of the eastern counties.
Presented by John Brown, Esq., 1852.

37230. The right humerus, wanting the proximal extremity; dredged from the North Sea. *Purchased*, 1863.

36258. The right humerus, imperfect proximally; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

45067. The imperfect left humerus ; from Ilford.
Brady Collection. *Purchased*, 1878.

45069. The immature left humerus ; from Ilford.
Brady Collection. *Purchased*, 1878.

45070. The left humerus, partly restored ; from Ilford.
Brady Collection. *Purchased*, 1878.

45071. The imperfect left humerus ; from Ilford.
Brady Collection. *Purchased*, 1878.

45073–85. Twelve imperfect specimens or fragments of the humerus ; from Ilford. *Brady Collection.* *Purchased*, 1878.

48043. The shaft of the left humerus of a young individual ; from Ilford. *Purchased*, 1877.

39366. The shaft of a young left humerus ; locality unknown.
Presented by Prof. Sir R. Owen, K.C.B., 1865.

30531. The left humerus ; dredged in the Bay of Galway, Ireland.
(*Fig.*) Figured by Leith-Adams, *op. cit.* pl. xvi. fig. 1.
Purchased, 1856.

24582. The imperfect left humerus of a small individual ; from Eschscholtz Bay.
Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

45103–4–5. Three specimens of the right radius ; from Ilford.
Brady Collection. *Purchased*, 1878.

45108. The shaft of the radius of a very young individual ; from Ilford. *Brady Collection.* *Purchased*, 1878.

38011. The associated right radius and ulna ; from Ilford. Figured
(*Fig.*) by Leith-Adams, *op. cit.* pl. xviii. figs. 1, 2.
Purchased, 1864.

48042. The associated left radius and ulna of a young individual ; from Ilford. *Purchased*, 1867.

48957. The right ulna ; dredged from the North Sea in 1878.
Presented by H. G. Hammond, Esq., 1878.

M. 3407. The proximal half of the left ulna ; from the Arctic regions. *No history.*

45086. The left ulna, wanting the distal epiphysis ; from Ilford.
Brady Collection. *Purchased*, 1878.

45087. The right ulna; from Ilford.
Brady Collection. Purchased, 1878.

45088–90. Three specimens of the left ulna, wanting their distal epiphyses; from Ilford.
Brady Collection. Purchased, 1878.

45092–4. Three specimens of the proximal half of the right ulna; from Ilford. *Brady Collection. Purchased*, 1878.

45096. The shaft of the ulna of a very young individual; from Ilford. *Brady Collection. Purchased*, 1878.

45098. The shaft of the immature right ulna; from Ilford.
Brady Collection. Purchased, 1878.

45099–102. Four specimens of the epiphysis of the ulna; from Ilford. *Brady Collection. Purchased*, 1878.

45111–3. Three specimens of the right scaphoid; from Ilford.
Brady Collection. Purchased, 1878.

36610. The left scaphoid; from Maidstone, Kent.
Purchased, 1855.

36607. The right lunar; from Grays. *Purchased*, 1855.

28043 The right lunar, of very large size; from Walton.
Presented by John Brown, Esq., 1852.

28044. The left lunar; from Walton.
Presented by John Brown, Esq., 1852.

45116. The right lunar; from Ilford.
Brady Collection. Purchased, 1878.

45114. The right cuneiform; from Ilford.
Brady Collection. Purchased, 1878.

45115. The imperfect right cuneiform; from Ilford.
Brady Collection. Purchased, 1878.

36611. The left trapezium; from Maidstone, Kent. Figured by (*Fig.*) Leith-Adams, *op. cit.* pl. xix. fig. 8. *Purchased*, 1855.

45118. The left magnum; from Ilford.
Brady Collection. Purchased, 1878.

28022. The left magnum; from Walton.
Presented by John Brown, Esq., 1852.

24586. A small left unciform; from Eschscholtz Bay.
Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

84 c (O. C.). The left unciform; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

28042. The right second metacarpal; from Walton.
Presented by John Brown, Esq., 1852.

38094–5. Two specimens of the right second metacarpal; from Grays. *Purchased*, 1864.

45119. The left second metacarpal; from Ilford.
Brady Collection. Purchased, 1878.

45120. The right third metacarpal; from Ilford.
Brady Collection. Purchased, 1878.

23720 e. The left second metacarpal; from Slade Green, Erith.
Purchased, 1849.

84 b (O. C.). The left second metacarpal; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

84 a (O. C.). Two specimens of the right third metacarpal, one wanting the distal half; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

44075. The proximal half of the right third metacarpal; from near Abbeville (Somme), France.
Presented by Prof. Sir R. Owen, K.C.B., 1873.

28039. The left third metacarpal; from the Essex coast.
Presented by John Brown, Esq., 1852.

36232. The left third metacarpal; from Ipswich, Suffolk. Figured (*Fig.*) by Leith-Adams, *op. cit.* pl. xviii. fig. 7.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

45122. The associated left third and fourth metacarpals; from Ilford. *Brady Collection. Purchased*, 1878.

45123. The left fourth metacarpal; from Ilford.
Brady Collection. Purchased, 1878.

45124. The left fourth metacarpal; from Ilford.
Brady Collection. Purchased, 1878.

45125. The right fourth metacarpal, wanting the distal epiphysis; from Ilford. *Brady Collection. Purchased*, 1878.

45185. The left fourth metacarpal; from Ilford.
Brady Collection. Purchased, 1878.

45190. The imperfect immature left fourth metacarpal; from Ilford. *Brady Collection. Purchased*, 1878.

21318. A first phalangeal; from Grays. *Purchased*, 1847.

45186–9. Four first phalangeals, two imperfect; from Ilford.
Brady Collection. Purchased, 1878.

45191. A first phalangeal; from Ilford.
Brady Collection. Purchased, 1878.

41526–7. Two specimens of the right innominate; from Ilford.
Brady Collection. Purchased, 1878.

45129–35. Seven imperfect specimens of the innominate; from Ilford. *Brady Collection. Purchased*, 1878.

45136. Part of an immature innominate; from Ilford.
Brady Collection. Purchased, 1878.

45840. Part of an immature innominate; locality unknown.
Brady Collection. Purchased, 1878.

44059. The left innominate; dredged in the North Sea off Lowestoft. *Purchased*, 1873.

297 (O. C.). (*Fig.*) The right innominate; from Eschscholtz Bay. Figured in Beechey's 'Voyage,' vol. ii. pl. ii. fig. 9.
Presented by Capt. F. W. Beechey, R.N.

24584. Two specimens of the innominate; from Eschscholtz Bay.
Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

7395. The left femur, wanting the proximal epiphysis; from Cheshire. *No history.*

46270. The left femur, wanting the proximal epiphysis; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46274. The shaft of a young left femur; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

45139–40. (*Fig.*) Two specimens of the left femur; from Ilford. No. 45139 is described and figured by Leith-Adams, *op. cit.* p. 165, pl. xix. fig. 7. *Brady Collection. Purchased*, 1878.

45141. The right femur, wanting the proximal extremity; from Ilford. *Brady Collection. Purchased*, 1878.

45144–9. Six specimens of the shaft of the femur; from Ilford.
Brady Collection. Purchased, 1878.

45151–3. Three specimens of the shaft of the right femur of very young individuals; from Ilford.
Brady Collection. Purchased, 1878.

45176–9. Four specimens of the head of the femur; from Ilford.
Brady Collection. Purchased, 1878.

M. 3394. The left femur, wanting the proximal extremity; locality unknown. *No history.*

42923. The left femur, wanting the head and great trochanter; dredged off the coast of Holland. Noticed by Leith-Adams, *op. cit.* p. 166. *Van Breda Collection. Purchased*, 1871.

42923 a. The right femur, wanting the proximal extremity and part of the condyles; dredged off the coast of Holland. Noticed by Leith-Adams, *op. cit.* p. 166.
Van Breda Collection. Purchased, 1871.

298 (O. C.). (*Fig.*) The right femur; from Eschscholtz Bay. Figured in Beechey's 'Voyage,' vol. ii. pl. ii. fig. 5.
Presented by Capt. F. W. Beechey, R.N.

299 (O. C.). The middle of the shaft of the left femur; from Eschscholtz Bay. *Presented by Capt. F. W. Beechey, R.N.*

45161–2. The left and right patella; from Ilford.
Brady Collection. Purchased, 1878.

21318 a. Three specimens of the patella; from Grays.
Purchased, 1847.

36423. The right tibia, wanting the distal epiphysis; from near Ipswich, Suffolk. *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1859.

36424. The right tibia, wanting the two epiphyses; dredged off the Essex coast. *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1859.

36425. Cast of the left tibia. The original was obtained from Harswell, Pocklington, Yorkshire, and is preserved in the Museum at York. *Brown Collection.*
Presented by Prof. Sir R. Owen, K.C.B., 1859.

28115. The shaft of a young right tibia; probably from the south of England. *Dixon Collection. Purchased*, 1853.

46278–9. Two specimens of the left tibia; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

21305. The right tibia; from Ilford. Noticed by Leith-Adams, *op. cit.* p. 169. *Purchased*, 1847.

45163. (*Fig.*) The right tibia; from Ilford. Figured by Leith-Adams, *op. cit.* pl. xix. fig. 12.
Brady Collection. Purchased, 1878.

45164. The left tibia, wanting the proximal extremity; from Ilford. *Brady Collection. Purchased*, 1878.

45165–9. Five specimens of the shaft of the tibia, several of them immature; from Ilford.
Brady Collection. Purchased, 1878.

82 a (O. C.). The left tibia; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

24581. The left tibia; from Eschscholtz Bay.
Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

45170. (*Fig.*) The distal half of the right fibula; from Ilford. Figured by Leith-Adams, *op. cit.* pl. xix. fig. 4.
Brady Collection. Purchased, 1878.

33419. (*Fig.*) The right calcaneum; dredged off Happisburgh, Norfolk. Figured by Leith-Adams, *op. cit.* pl. xix. fig. 1.
Layton Collection. Purchased, 1858.

82 c (O. C.). (*Fig.*) The left calcaneum; from Eschscholtz Bay. Figured in Beechey's 'Voyage,' vol. ii. pl. ii. fig. 10.
Presented by Capt. F. W. Beechey, R.N.

45171. (*Fig.*) The right astragalus; from Ilford. Figured by Leith-Adams, *op. cit.* pl. xix. fig. 5.
Brady Collection. Purchased, 1878.

45172. The right astragalus; from Ilford.
Brady Collection. Purchased, 1878.

45174. The left astragalus; from Ilford.
Brady Collection. Purchased, 1878.

18375. The left astragalus; from the Norfolk coast.
Presented by E. Charlesworth, Esq., 1844.

23721 e. The left astragalus; from Slade Green.
Purchased, 1849.

303 (O. C.). The right astragalus; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

27931. The right navicular; from Walton. Noticed by Leith-Adams, *op. cit.* p. 171.
Presented by John Brown, Esq., 1852.

M. 455. The right navicular; from Ilford.
Enniskillen Collection. Purchased, 1882.

45179. The right ectocuneiform ; from Ilford.
Brady Collection. Purchased, 1878.

28041. The right second metatarsal ; from the Essex coast.
Presented by John Brown, Esq., 1852.

28006. The left third metatarsal ; from Clacton.
Presented by John Brown, Esq., 1852.

23713 e. The left fifth metatarsal ; from Slade Green.
Purchased, 1849.

21275. The atlas vertebra ; from Ilford. *Purchased*, 1847.

45025. The atlas vertebra ; from Ilford. Figured by Leith-Adams, (*Fig.*) *op. cit.* pl. xvii. fig. 1.
Brady Collection. Purchased, 1878.

45026–9. Four specimens of the atlas vertebra, some imperfect ; from Ilford. *Brady Collection. Purchased*, 1878.

16862. The atlas vertebra ; from Ilford.
Presented by W. Thompson, Esq. About 1842.

46233–4. Two specimens of the atlas vertebra ; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

41658. The imperfect atlas vertebra ; found on the coast at Whitby, Yorkshire. *Toulmin-Smith Collection. Purchased*, 1869.

M. 473. The atlas vertebra ; dredged in the North Sea.
Purchased, 1883.

44784. The atlas vertebra ; locality unknown.
Presented by B. Bright, Esq., 1873.

45030. The imperfect axis vertebra ; from Ilford. Figured by (*Fig.*) Leith-Adams, *op. cit.* pl. xvii. fig. 6.
Brady Collection. Purchased, 1878.

81 c (O. C.). The axis vertebra ; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

81 b (O. C.). A cervical vertebra ; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

M. 3405. A cervical vertebra ; from Ilford. *No history.*

19830, 28009. Two cervical vertebræ; from Clacton.
Presented by John Brown, Esq., 1852.

46236–7. Two cervical vertebræ; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

46242–3. Two specimens of the seventh cervical vertebra; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

45033–4. Two early dorsal vertebræ; from Ilford.
Brady Collection. Purchased, 1878.

27878, 28047. Two early dorsal vertebræ; from Clacton.
Presented by John Brown, Esq., 1852.

44785. An early dorsal vertebra; locality unknown.
Presented by B. Bright, Esq., 1873.

M. 3391. Three associated dorsal vertebræ; from the Arctic regions.
No history.

81 a, d, e, f (O. C.). Four dorsal vertebræ; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

81 g (O. C.). The neural arch of a dorsal vertebra; from Eschscholtz Bay. *Presented by Capt. F. W. Beechey, R.N.*

24579. Eight associated dorsal vertebræ; from Eschscholtz Bay.
Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

42644. A late dorsal vertebra; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

45041. The associated last six dorsal and first three lumbar vertebræ; from Ilford.
Brady Collection. Purchased, 1878.

27939. A lumbar vertebra; dredged off the eastern coast.
Presented by John Brown, Esq., 1852.

39363. A lumbar vertebra; from Clacton.
Brown Collection. Presented by Prof. Sir R. Owen, K.C.B., 1859.

18371. The centrum of a lumbar vertebra; from the Norfolk coast.
Presented by E. Charlesworth, Esq., 1844.

46247–8. Two lumbar vertebræ; dredged off the eastern coast.
Owles Collection. Purchased, 1874

44786. A lumbar vertebra; locality unknown.
Presented by B. Bright, Esq., 1873.

24580. The sacrum; from Eschscholtz Bay.
Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

27933. The anterior half of the sacrum; from Clacton.
Presented by John Brown, Esq., 1852.

46249. Two associated sacral vertebræ; dredged off the eastern coast. *Owles Collection. Purchased*, 1874.

46250. A sacral vertebra; dredged off the eastern coast.
Owles Collection. Purchased, 1874.

27997. A caudal vertebra; from Clacton.
Presented by John Brown, Esq., 1852.

M. 172. A rib; from Ilford.
Enniskillen Collection. Purchased, 1882.

45055–6. Two ribs from Ilford.
Brady Collection. Purchased, 1878.

45049–54. Six imperfect ribs; from Ilford.
Brady Collection. Purchased, 1878.

81 h. A rib; from Eschscholtz Bay.
Presented by Capt. F. W. Beechey, R.N.

24586. Four ribs; from Eschscholtz Bay.
Presented by Capt. Kellet and Lieut. Wood, R.N., 1850.

M. 3392. Hair; from Behring's Straits. *Purchased.*

Generically Undetermined Specimens.

The following specimens from the Pliocene Siwaliks of India cannot be generically determined. The greater number of them are figured by Falconer and Cautley in the 'Fauna Antiqua Sivalensis.'

A. *From the Siwalik Hills. Unless otherwise stated the specimens belong to the Cautley Collection.—Presented*, 1842.

M. 3171. Fragment of a twisted incisor. Figured, *op. cit.* pl. xli. (*Fig.*) fig. 1.

M. 3172. The anterior portion of an incisor. Figured, *op. cit.* pl. xli. (*Fig.*) fig. 2.

M. 3173. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 3, (*Fig.*) 3 *a*.

M. 3174. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 4, (*Fig.*) 4 *a*, 4 *b*.

M. 3104. Fragment of an incisor. Figured, *op. cit.* pl. xli. fig. 5. (*Fig.*)

M. 3175. Fragment of an incisor in its alveolus. Figured, *op. cit.* (*Fig.*) pl. xli. figs. 6, 6 *a*.

M. 3176. The anterior portion of an incisor. Figured, *op. cit.* (*Fig.*) pl. xli. figs. 7, 7 *a*.

M. 3177. Middle portion of an incisor. Figured, *op. cit.* pl. xli. (*Fig.*) figs. 8, 8 *a*.

M. 3178. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 9, (*Fig.*) 9 *a*.

M. 3179. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 10, (*Fig.*) 10 *a*.

M. 3180. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 11, (*Fig.*) 11 *a*.

M. 3181. Tip of an incisor. Figured, *op. cit.* pl. xli. figs. 12, 12 *a*. (*Fig.*)

M. 3182. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 13, (*Fig.*) 13 *a*.

M. 3183. Fragments of the two incisors. Figured, *op. cit.* pl. xli. (*Fig.*) figs. 14, 14 *a*, and 25, 25 *a*.

M. 3184. Anterior portion of an incisor. Figured, *op. cit.* pl. xli. (*Fig.*) figs. 15, 15 *a*.

16318. Tip of an incisor. Figured, *op. cit.* pl. xli. figs. 16, 16 *a*. (*Fig.*)

M. 3185. Tip of an incisor. Figured, *op. cit.* pl. xli. figs. 17, 17 *a*. (*Fig.*)

M. 3186. Anterior portion of an incisor. Figured, *op. cit.* pl. xli. (*Fig.*) figs. 18, 18 *a*.

M. 3187. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 19, (*Fig.*) 19 *a*.

M. 3188. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 20, (*Fig.*) 20 *a*.

M. 3189. Middle portions of the two incisors. Figured, *op. cit.* (*Fig.*) pl. xli. figs. 21, 21 *a*.

M. 3190. Fragment of an incisor. Figured, *op. cit.* pl. xli. figs. 22, (*Fig.*) 22 *a*.

M. 3191. The anterior extremity of the premaxillæ, showing the (*Fig.*) bases of the incisors. Figured, *op. cit.* pl. xli. figs. 23, 23 *a*. *Presented by Dr. Hugh Falconer.*

M. 3192. Fragment of the premaxillæ. Figured, *op. cit.* pl. xli. (*Fig.*) fig. 24.

16415. Fragment of the right scapula. Figured, *op. cit.* pl. xlix. (*Fig.*) fig. 1.

M. 3287. Fragment of the right scapula. Figured, *op. cit.* pl. xlix. (*Fig.*) figs. 2, 2 *a*.

M. 3288. Fragment of the right scapula. Figured, *op. cit.* pl. xlix. (*Fig.*) fig. 3.

36699. Fragment of the right scapula. Figured, *op. cit.* pl. xlix. (*Fig.*) figs. 4, 4 *a*.
Presented by the Secretary of State for India, 1860.

M. 3293. Proximal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. figs. 3, 3 *a*, 3 *b*.

M. 3295. Proximal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 4.

M. 3294. Proximal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 5.

M. 3297. Proximal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 6.

16425. Proximal extremity of the right humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 7.

M. 3299. Proximal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 8.

M. 3300. Proximal extremity of the right humerus. Figured, *op.* (*Fig.*) *cit.* pl. xlviii. fig. 9.

M. 3301. Proximal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 10.

M. 3302. Distal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. figs. 11, 11 *a*, 11 *b*.

M. 3303. Distal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. figs. 12, 12 *a*, 12 *b*.

M. 3291. Distal extremity of the right humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. figs. 13, 13 *a*, 13 *b*.

16419. Distal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 14, 14 *a*, 14 *b*.

M. 3304. Distal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 15.

M. 3315. Distal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 16.

M. 3298. Distal extremity of the right humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 17.

M. 3296. Distal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 18.

M. 3305. Distal extremity of the right humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 19.

M. 3292. Distal extremity of the right humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 20.

M. 3306. Distal extremity of the right humerus. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 21.

M. 3289. Proximal half of the right humerus. Figured, *op. cit.* (*Fig.*) pl. xlix. figs. 5, 5 *a*, 5 *b*.

M. 3307. Distal extremity of the left humerus. Figured, *op. cit.* (*Fig.*) pl. xlix. figs. 7, 7 *a*, 7 *b*.

M. 3308. Proximal halves of the left radius and ulna. Figured, *op. cit.* (*Fig.*) pl. xlviii. figs. 22, 22 *a*, 22 *b*.

M. 3309. Proximal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlviii. figs. 23, 23 *a*.

M. 3310. Proximal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 24.

M. 3311. Proximal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 25.

47134. Proximal extremities of the left radius and ulna. Figured, (*Fig.*) *op. cit.* pl. xlviii. fig. 26.

Presented by C. Falconer, Esq., 1867.

M. 3312. Proximal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 27.

M. 3314. Proximal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlviii. fig. 28.

M. 3313. Proximal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlviii. figs. 29, 29 *a*.

36701. Proximal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. figs. 8, 8 *a*, 8 *b*.

Presented by the Secretary of State for India, 1860.

M. 3316. Distal extremities of the right radius and ulna. Figured, (*Fig.*) *op. cit.* pl. xlix. fig. 9.

M. 3290. Distal extremities of the left radius and ulna. Figured, (*Fig.*) *op. cit.* pl. xlix. figs. 10, 10 *a*.

M. 3317. Distal extremities of the right radius and ulna. Figured, (*Fig.*) *op. cit.* pl. xlix. figs. 12, 12 *a*.

M. 3318. Distal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. figs. 13, 13 *a*.

M. 3319. Distal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. figs. 14, 14 *a*.

M. 3320. Distal extremities of the right radius and ulna. Figured, (*Fig.*) *op. cit.* pl. xlix. fig. 15.

M. 3239. Distal extremities of the right radius and ulna. Figured, (*Fig.*) *op. cit.* pl. xlix. fig. 16.

M. 3321. Distal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 17.

M. 3322. Distal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 18.

M. 3234. Distal extremity of the right radius. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 19.

M. 3323. Distal extremity of the left radius. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 20.

M. 3235. Distal extremity of the right radius. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 21.

M. 3324. Distal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 22.

M. 3237. Distal extremity of the right radius. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 23.

M. 3325. Distal extremity of the right radius. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 24.

M. 3326. Distal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 25.

M. 3236. Distal extremity of the left radius. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 26.

M. 3327. Distal extremity of the left radius. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 27.

M. 3328. Distal extremity of the left radius. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 28.

M. 3329. Distal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 29.

M. 3330. Distal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 30.

M. 3331. Distal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 31.

M. 3332. Distal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 32.

M. 3333. Distal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 33.

M. 3334. Distal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 34.

M. 3335. Distal extremity of the left ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 35.

M. 3336. Distal extremity of the right ulna. Figured, *op. cit.* (*Fig.*) pl. xlix. fig. 36.

36711. Distal extremity of the left ulna.

Presented by the Secretary of State for India, 1860.

M. 3194. The associated distal extremities of the right radius and ulna, together with the lunar, trapezoid, magnum, and unciform, and the proximal extremities of the second, third, and fourth metacarpals. Figured, *op. cit.* pl. l. fig. 1. (*Fig.*)

M. 3196. The associated distal extremity of the left ulna, the carpus, and the proximal extremity of the third metacarpal. Figured, *op. cit.* pl. l. figs. 2, 2 *a*, 2 *b*. (*Fig.*)

M. 3197. The right scaphoid. Figured, *op. cit.* pl. l. figs. 3, 3 *a*. (*Fig.*)

18465. The left scaphoid. Figured, *op. cit.* pl. l. figs. 4, 4 *a*. (*Fig.*)

M. 3198. The left scaphoid. Figured, *op. cit.* pl. l. figs. 5, 5 *a*. (*Fig.*)

M. 3199. The right lunar. Figured, *op. cit.* pl. l. figs. 6, 6 *a*, 6 *b*. (*Fig.*)

M. 3200. The left lunar. Figured, *op. cit.* pl. l. figs. 7, 7 *a*, 7 *b*. (*Fig.*)

M. 3201. The right lunar. Figured, *op. cit.* pl. l. figs. 8, 8 *a*, 8 *b*. (*Fig.*)

M. 3202. The right lunar. Figured, *op. cit.* pl. l. figs. 9, 9 *a*, 9 *b*. (*Fig.*)

M. 3203. The right lunar. Figured, *op. cit.* pl. l. figs. 10, 10 *a*, 10 *b*. (*Fig.*)

17405. The right lunar. Figured, *op. cit.* pl. l. figs. 11, 11 *a*, 11 *b*. (*Fig.*)

M. 3204. The left lunar. Figured, *op. cit.* pl. l. figs. 12, 12 *a*, 12 *b*. (*Fig.*)

M. 3205. The right lunar. Figured, *op. cit.* pl. l. figs. 13, 13 *a*, 13 *b*. (*Fig.*)

M. 3206. The left lunar. Figured, *op. cit.* pl. l. figs. 14, 14 *a*, 14 *b*. (*Fig.*)

17859. The right lunar. Figured, *op. cit.* pl. l. figs. 15, 15 *a*, 15 *b*. (*Fig.*)

M. 3238. The right lunar.

36714. The right lunar.

Presented by the Secretary of State for India, 1860.

36715. The right cuneiform.
Presented by the Secretary of State for India, 1860.

17997. The imperfect left cuneiform.

M. 3210. The left cuneiform. *Presented by Dr. Hugh Falconer.*

M. 3211. The left cuneiform.

M. 3207. The right cuneiform. Figured, *op. cit.* pl. l. figs. 16, 16 *a*, (*Fig.*) 16 *b*.

17809. The right cuneiform. Figured, *op. cit.* pl. l. figs. 17, 17 *a*, (*Fig.*) 17 *b*.

M. 3208. The right cuneiform. Figured, *op. cit.* pl. l. figs. 18, 18 *a*, (*Fig.*) 18 *b*.

M. 3209. The right cuneiform. Figured, *op. cit.* pl. l. figs. 19, 19 *a*, (*Fig.*) 19 *b*.

M. 3212. The left cuneiform. Figured, *op. cit.* pl. l. figs. 21, 21 *a*, (*Fig.*) 21 *b*.

M. 3213. The left pisiform. Figured, *op. cit.* pl. l. figs. 23, 23 *a*. (*Fig.*)

M. 3214. The left pisiform. Figured, *op. cit.* pl. l. figs. 24, 24 *a*. (*Fig.*)

M. 3215. The left trapezoid. Figured, *op. cit.* pl. l. figs. 26, 26 *a*, (*Fig.*) 26 *b*, 26 *c*.

M. 3216. The right trapezoid. Figured, *op. cit.* pl. l. figs. 27, 27 *a*, (*Fig.*) 27 *b*, 27 *c*.

M. 3217. The left magnum. Figured, *op. cit.* pl. li. figs. 2, 2 *a*, 2 *b*, (*Fig.*) 2 *c*, 2 *d*.

M. 3218. The left magnum. Figured, *op. cit.* pl. li. figs. 3, 3 *a*, 3 *b*, (*Fig.*) 3 *c*, 3 *d*.

17863. The left magnum. Figured, *op. cit.* pl. li. figs. 4, 4 *a*, 4 *b*, (*Fig.*) 4 *c*, 4 *d*.

17832. The right magnum. Figured, *op. cit.* pl. li. figs. 5, 5 *a*, 5 *b*, (*Fig.*) 5 *c*, 5 *d*.

M. 3233. The right magnum.

17457. The left magnum.

36716. The left magnum.
Presented by the Secretary of State for India, 1860.

36717. The right unciform.

Presented by the Secretary of State for India, 1860.

M. 3219. The right unciform. Figured, *op. cit.* pl. li. figs. 7, 7 *a*, (*Fig.*) 7 *b*, 7 *c*.

M. 3220. The left unciform. Figured, *op. cit.* pl. li. figs. 8, 8 *a*, 8 *b*, (*Fig.*) 8 *c*.

17453. The left unciform. Figured, *op. cit.* pl. li. figs. 9, 9 *a*, 9 *b*, (*Fig.*) 9 *c*.

17452. The right unciform. Figured, *op. cit.* pl. li. figs. 10, 10 *a*, (*Fig.*) 10 *b*, 10 *c*.

M. 3221. The left unciform. Figured, *op. cit.* pl. li. figs. 11, 11 *a*, (*Fig.*) 11 *b*, 11 *c*.

M. 3222. The left unciform. Figured, *op. cit.* pl. li. figs. 12, 12 *a*, (*Fig.*) 12 *b*, 12 *c*.

M. 3223. The left first metacarpal. Figured, *op. cit.* pl. li. figs. 13, (*Fig.*) 13 *a*, 13 *b*.

M. 3224. The right second metacarpal. Figured, *op. cit.* pl. li. (*Fig.*) figs. 14, 14 *a*, 14 *b*.

M. 3225. The left second metacarpal. Figured, *op. cit.* pl. li. figs. 15, (*Fig.*) 15 *a*, 15 *b*.

15354. The left second metacarpal. Figured, *op. cit.* pl. li. figs. 16, (*Fig.*) 16 *a*, 16 *b*.

M. 3226. The right third metacarpal. Figured, *op. cit.* pl. li. figs. 17, (*Fig.*) 17 *a*, 17 *b*.

17433. The right third metacarpal. Figured, *op. cit.* pl. li. figs. 18, (*Fig.*) 18 *a*, 18 *b*.

36719. The right third metacarpal. Figured, *op. cit.* pl. li. figs. 19, (*Fig.*) 19 *a*, 19 *b*.

Presented by the Secretary of State for India, 1860.

M. 3232. The left third metacarpal.

M. 3231. The left fourth metacarpal.

15353. The right fourth metacarpal.

36710. The left fourth metacarpal. Figured, *op. cit.* pl. li. figs. 21, (*Fig.*) 21 *a*, 21 *b*.

Presented by the Secretary of State for India, 1860.

M. 3227. The left fourth metacarpal. Figured, *op. cit.* pl. li. figs. 22, (*Fig.*) 22 *a*, 22 *b*.

18005. The left fourth metacarpal. Figured, *op. cit.* pl. li. figs. 23, (*Fig.*) 23 *a*, 23 *b*.

M. 3228. The right fifth metacarpal. Figured, *op. cit.* pl. li. figs. 24, (*Fig.*) 24 *a*, 24 *b*.

M. 3229. The right fifth metacarpal. Figured, *op. cit.* pl. li. figs. 25, (*Fig.*) 25 *a*, 25 *b*.

M. 3230. The left fifth metacarpal. Figured, *op. cit.* pl. li. figs. 26, (*Fig.*) 26 *a*, 26 *b*.

18002. The first phalangeal of the right third digit. Figured, *op. cit.* (*Fig.*) pl. li. figs. 27, 27 *a*, 27 *b*.

17788. The first phalangeal of the left fourth digit. Figured, *op.* (*Fig.*) *cit.* pl. li. figs. 28, 28 *a*, 28 *b*.

18028. The first phalangeal of the right third digit. Figured, *op. cit.* (*Fig.*) pl. li. figs. 29, 29 *a*, 29 *b*; entered in the description of the plate (Pal. Mem. vol. i. p. 487) as the third metacarpal.

18030. The first phalangeal of the left third digit. Figured, *op. cit.* (*Fig.*) pl. li. figs. 30, 30 *a*, 30 *b*; entered in the description of the plate as the third metacarpal.

16441. Fragment of the right innominate. Figured, *op. cit.* pl. liii. (*Fig.*) fig. 1.

16408. Fragment of an innominate. Figured, *op. cit.* pl. liii. figs. (*Fig.*) 2, 2 *a*.

M. 3361. Fragment of the left innominate. Figured, *op. cit.* pl. liii. (*Fig.*) fig. 3.

M. 3362. Fragment of the right innominate. Figured, *op. cit.* pl. (*Fig.*) liii. fig. 4.

M. 3363. Fragment of the right innominate. Figured, *op. cit.* pl. (*Fig.*) liii. fig. 5.

M. 3364. Fragment of the left innominate. Figured, *op. cit.* pl. liii. (*Fig.*) fig. 6.

M. 3365. Fragment of the right innominate. Figured, *op. cit.* (*Fig.*) pl. liii. fig. 7.

16433. Fragment of an innominate. Figured, *op. cit.* pl. liii. fig. 8. (*Fig.*)

M. 3337. Proximal portion of the left femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 1.

M. 3338. Proximal portion of the right femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 2.

M. 3339. Proximal portion of the right femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 3.

M. 3340. Proximal portion of the right femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 4.

M. 3341. Proximal portion of the left femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 5.

M. 3342. Proximal portion of the right femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 6.

M. 3343. Proximal portion of the right femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 7.

M. 3344. Proximal portion of the left femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 8.

M. 3366. Distal portion of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) figs. 9, 9 *a*, 9 *b*, 9 *c*.

M. 3367. Distal half of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) figs. 10, 10 *a*, 10 *b*, 10 *c*.

M. 3368. Distal portion of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) figs. 11, 11 *a*, 11 *b*, 11 *c*.

M. 3369. Distal portion of the left femur. Figured, *op. cit.* pl. lii. (*Fig.*) figs. 12, 12 *a*, 12 *b*, 12 *c*.

M. 3370. Distal portion of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) figs. 13, 13 *a*, 13 *b*, 13 *c*.

M. 3371. Distal portion of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 15.

M. 3354. Distal portion of the left femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 16.

M. 3355. Distal epiphysis of the left femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 17.

M. 3356. Distal portion of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 18.

M. 3372. Distal extremity of the right femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 19.

M. 3357. Distal portion of the left femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 20.

M. 3358. Distal portion of the left femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 21.

M. 3373. Distal portion of the right femur. Figured, *op. cit.* (*Fig.*) pl. lii. fig. 22.

M. 3374. Distal portion of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 23.

M. 3375. Distal portion of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 25.

M. 3359. Distal portion of the right femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 26.

M. 3376. Distal portion of the left femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 27.

M. 3377. Distal portion of the left femur. Figured, *op. cit.* pl. lii. (*Fig.*) fig. 29.

36702. Proximal half of the right femur. Figured, *op. cit.* pl. liii. (*Fig.*) fig. 9.
Presented by the Secretary of State for India, 1860.

M. 3360. Head of a femur. Figured, *op. cit.* pl. liii. fig. 10. (*Fig.*)

36712. A patella. Figured, *op. cit.* pl. lv. figs. 5, 5 *a*. (*Fig.*) *Presented by the Secretary of State for India*, 1860.

M. 3269. A patella. Figured, *op. cit.* pl. lv. figs. 6, 6 *a*. (*Fig.*)

M. 3270. A patella. Figured, *op. cit.* pl. lv. figs. 7, 7 *a*. (*Fig.*)

17804. A patella. Figured, *op. cit.* pl. lv. figs. 8, 8 *a*. (*Fig.*)

17851. A patella. Figured, *op. cit.* pl. lv. figs. 9, 9 *a*. (*Fig.*)

17998. A patella.

M. 3378. Proximal portion of the left tibia. Figured, *op. cit.* (*Fig.*) pl. liii. figs. 14, 14 *a*.

M. 3379. Proximal portion of the right tibia. Figured, *op. cit.* (*Fig.*) pl. liii. figs. 16, 16 *a*.

M. 3380. Proximal portion of the right tibia. Figured, *op. cit.* (*Fig.*) pl. liii. figs. 17, 17 *a*.

M. 3381. Proximal portion of the right tibia. Figured, *op. cit.* (*Fig.*) pl. liii. fig. 19.

M. 3382. Proximal portion of the right tibia. Figured, *op. cit.* (*Fig.*) pl. liii. fig. 20.

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M. 3352. Distal portion of the right tibia. Figured, *op. cit.* pl. liii. (*Fig.*) figs. 36, 36 *a*.

M. 3244. Distal portion of the right tibia. Figured, *op. cit.* pl. liii. (*Fig.*) fig. 37.

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17432. The left calcaneum. Figured, *op. cit.* pl. liv. figs. 2, 2 *a*, (*Fig.*) 2 *b*.

17431. The left calcaneum. Figured, *op. cit.* pl. liv. figs. 3, 3 *a*, (*Fig.*) 3 *b*.

18467. The right calcaneum. Figured, *op. cit.* pl. liv. figs. 4, 4 *a*, (*Fig.*) 4 *b*.

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M. 3251. The right calcaneum. Figured, *op. cit.* pl. liv. figs. 6, (*Fig.*) 6 *a*, 6 *b*.

M. 3252. The imperfect left calcaneum. Figured, *op. cit.* pl. liv. (*Fig.*) figs. 7, 7 *a*, 7 *b*.

17443. The left calcaneum. Figured, *op. cit.* pl. liv. figs. 8, 8 *a*, (*Fig.*) 8 *b*.

17441. The right calcaneum. Figured, *op. cit.* pl. liv. figs. 9, 9 *a*, (*Fig.*) 9 *b*.

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M. 3254. The left calcaneum. Figured, *op. cit.* pl. liv. figs. 12, (*Fig.*) 12 *a*, 12 *b*.

M. 3255. The left calcaneum. Figured, *op. cit.* pl. liv. figs. 14, (*Fig.*) 14 *a*, 14 *b*.

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M. 3257. The left astragalus. Figured, *op. cit.* pl. liv. figs. 18, (*Fig.*) 18 *a*.

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17852. The left astragalus. Figured, *op. cit.* pl. liv. figs. 21, 21 *a*. (*Fig.*)

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M. 3262. The left astragalus. Figured, *op. cit.* pl. liv. figs. 24, (*Fig.*) 24 *a*.

M. 3263. The right astragalus. Figured, *op. cit.* pl. liv. figs. 25, (*Fig.*) 25 *a*.

M. 3264. The right astragalus. Figured, *op. cit.* pl. liv. figs. 26, (*Fig.*) 26 *a*.

M. 3265. The left astragalus. Figured, *op. cit.* pl. liv. figs. 27, (*Fig.*) 27 *a*.

17848. The right astragalus. Figured, *op. cit.* pl. liv. figs. 28, 28 *a*. (*Fig.*)

M. 3266. The left astragalus. Figured, *op. cit.* pl. liv. figs. 29, (*Fig.*) 29 *a*.

M. 3267. The right astragalus. Figured, *op. cit.* pl. liv. figs. 30, (*Fig.*) 30 *a*.

17842. The left astragalus. Figured, *op. cit.* pl. liv. figs. 31, 31 *a*. (*Fig.*)

17855. The right astragalus.

17858. The right astragalus.

M. 3270. The left ectocuneiform. Figured, *op. cit.* pl. lv. figs. 10, (*Fig.*) 10 *a*, 10 *b*.

17789. The left ectocuneiform. Figured, *op. cit.* pl. lv. figs. 11, (*Fig.*) 11 *a*, 11 *b*.

17817. The left ectocuneiform. Figured, *op. cit.* pl. lv. figs. 12, (*Fig.*) 12 *a*, 12 *b*.

17814. The left ectocuneiform. Figured, *op. cit.* pl. lv. figs. 13, (*Fig.*) 13 *a*, 13 *b*.

M. 3272. The right ectocuneiform. Figured, *op. cit.* pl. lv. figs. 14, (*Fig.*) 14 *a*, 14 *b*.

M. 3273. The right ectocuneiform. Figured, *op. cit.* pl. lv. figs. 15, (*Fig.*) 15 *a*, 15 *b*.

17466. The right second metatarsal. Figured, *op. cit.* pl. lv. (*Fig.*) figs. 16, 16 *a*, 16 *b*.

17822. The right second metatarsal. Figured, *op. cit.* pl. lv. (*Fig.*) figs. 17, 17 *a*, 17 *b*.

M. 3274. The left third metatarsal. Figured, *op. cit.* pl. lv. figs. 18, (*Fig.*) 18 *a*, 18 *b*.

17823. The right second metatarsal. Figured, *op. cit.* pl. lv. (*Fig.*) figs. 19, 19 *a*, 19 *b*.

M. 3275. The left third metatarsal. Figured, *op. cit.* pl. lv. figs. 20, (*Fig.*) 20 *a*, 20 *b*.

17465. The left third metatarsal. Figured, *op. cit.* pl. lv. figs. 21, *Fig.*) 21 *a*, 21 *b*.

17464. The left third metatarsal. Figured, *op. cit.* pl. lv. figs. 22, (*Fig.*) 22 *a*, 22 *b*.

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M. 3278. The left fourth metatarsal. Figured, *op. cit.* pl. lv. (*Fig.*) figs. 25, 25*a*, 25 *b*.

M. 3279. The first phalangeal of the right second digit. Figured, (*Fig.*) *op. cit.* pl. lv. figs. 26, 26 *a*, 26 *b*.

M. 3280. The first phalangeal of the right second digit. Figured, (*Fig.*) *op. cit.* pl. lv. figs. 27, 27 *a*, 27 *b*.

M. 3281. The first phalangeal of the right second digit. Figured, (*Fig.*) *op. cit.* pl. lv. figs. 28, 28 *a*, 28 *b*.

36720. The first phalangeal of the right second digit. Figured, (*Fig.*) *op. cit.* pl. lv. figs. 29, 29 *a*, 29 *b*.
Presented by the Secretary of State for India, 1860.

36721. The first phalangeal of the left second digit. Figured, *op.* (*Fig.*) *cit.* pl. lv. figs. 30, 30 *a*, 30 *b*.
Presented by the Secretary of State for India, 1860.

M. 3282. The first phalangeal of the right second digit. Figured, (*Fig.*) *op. cit.* pl. lv. figs. 31, 31 *a*, 31 *b*.

M. 3283. The first phalangeal of the right third digit. Figured, *op.* (*Fig.*) *cit.* pl. lv. figs. 32, 32 *a*, 32 *b*.

M. 3284. The first phalangeal of the left fourth digit. Figured, (*Fig.*) *op. cit.* pl. lv. figs. 33, 33 *a*, 33 *b*.

M. 3285. The first phalangeal of the right fourth digit. Figured, (*Fig.*) *op. cit.* pl. lv. 34, 34 *a*, 34 *b*.

M. 3286. The first phalangeal of the left fourth digit. Figured, *op.* (*Fig.*) *cit.* pl. lv. figs. 35, 35 *a*, 35 *b*.

17824. The first phalangeal of the right fourth digit. Figured, *op.* (*Fig.*) *cit.* pl. lv. figs. 36, 36 *a*, 36 *b*.

36697. The atlas vertebra. Figured, *op. cit.* pl. xlvi. figs. 1, 1 *a*, (*Fig.*) 1 *b* *Presented by the Secretary of State for India*, 1860.

16435. The atlas vertebra. Figured, *op. cit.* pl. xlvi. figs. 2, 2 *a*, (*Fig.*) 2 *b*.

M. 3150. The atlas vertebra. Figured, *op. cit.* pl. xlvi. figs. 3, 3 *a*, (*Fig.*) 3 *b*.

M. 3151. The atlas vertebra. Figured, *op. cit.* pl. xlvi. fig. 5. (*Fig.*)

M. 3193. The imperfect atlas vertebra. Figured, *op. cit.* pl. xlvi. (*Fig.*) fig. 6.

M. 3152. The atlas vertebra. Figured, *op. cit.* pl. xlvi. figs. 7, 7 *a*, (*Fig.*) 7 *b*.

M. 3153. The atlas vertebra. Figured, *op. cit.* pl. xlvi. fig. 8. (*Fig.*) *Presented by Dr. Hugh Falconer.*

M. 3154. The atlas vertebra. Figured, *op. cit.* pl. xlvi. fig. 9. (*Fig.*)

M. 3155. The atlas vertebra. Figured, *op. cit.* pl. xlvi. fig. 10. (*Fig.*)

M. 3194. The atlas with the anterior part of the axis vertebra (*Fig.*) attached to it. Figured, *op. cit.* pl. xlvi. fig. 11.

16432. The axis vertebra. Figured, *op. cit.* pl. xlvii. figs. 1, 1 *a*. (*Fig.*)

M. 3156. The axis vertebra of a young individual. Figured, *op.* (*Fig.*) *cit.* pl. xlvii. figs. 3, 3 *a*.

M. 3157. The centrum of the axis vertebra. Figured, *op. cit.* (*Fig.*) pl. xlvii. figs. 4, 4 *a*.

M. 3158. The centrum of the axis vertebra. Figured, *op. cit.* (*Fig.*) pl. xlvii. figs. 5, 5 *a*.

M. 3159. The centrum of the axis vertebra. Figured, *op. cit.* (*Fig.*) pl. xlvii. figs. 6, 6 *a*.

M. 3160. The centrum of the axis vertebra. Figured, *op. cit.* (*Fig.*) pl. xlvii. figs. 7, 7 *a*.

M. 3161. The centrum of the axis vertebra. Figured, *op. cit.* (*Fig.*) pl. xlvii. figs. 8, 8 *a*.

M. 3162. The centrum of the axis vertebra. Figured, *op. cit.* (*Fig.*) pl. xlvii. figs. 9, 9 *a*.

M. 3388. Two cervical vertebræ in matrix.

M. 3163. (*Fig.*) Eight associated vertebræ, consisting of the last two cervical and the first six dorsal. Figured, *op. cit.* pl. xlvii. fig. 10.

M. 3164. (*Fig.*) An imperfect dorsal vertebra. Figured, *op. cit.* pl. xlvii. fig. 11.

M. 3165. (*Fig.*) An imperfect dorsal vertebra. Figured, *op. cit.* pl. xlvii. fig. 12.

M. 3166. (*Fig.*) An imperfect dorsal vertebra. Figured, *op. cit.* pl. xlvii. fig. 13.

M. 3167. (*Fig.*) An imperfect dorsal vertebra. Figured, *op. cit.* pl. xlvii. fig. 13 *a*.

36698. Three associated dorsal vertebræ.
Presented by the Secretary of State for India, 1860.

M. 3168. (*Fig.*) A lumbar vertebra. Figured, *op. cit.* pl. xlvii. fig. 14.

M. 3169. (*Fig.*) A lumbar vertebra. Figured, *op. cit.* pl. xlvii. fig. 15.

M. 3170. (*Fig.*) The imperfect sacrum. Figured, *op. cit.* pl. xlvii. fig 16.

16409. Three specimens of the sacrum.

B. *From Perim Island, Gulf of Cambay.*

48452. Shaft of a humerus, of very large size.
Presented by Dr. Beust, 1849.

40681. Head of an ulna. *Purchased*, 1867.

ADDENDA.

The two following specimens were presented after the preceding pages were in type.

Mastodon perimensis (page 56).

M. 3499. The last three ridges and talon of a second (?) right lower true molar, probably belonging to this species; from Perim Island. Cement is present in the valleys.

Presented by Col. J. W. Watson, 1886.

Mastodon cautleyi (page 71).

M. 3500. The first three ridges (the third wanting the inner column) of the germ of the second left upper true molar of a small individual; from Perim Island. This specimen, in which the width anteriorly is 0,078, is rather smaller than No. M. 2887 (page 72), but agrees in every detail of structure.

Presented by Col. J. W. Watson, 1886.

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